References

[1] M. R. Kagan and R. L. McCreery, “Reduction of Fluorescence Interference in Raman Spectroscopy via Analyte Adsorption on Graphitic Carbon,” *Anal. Chem.*, vol. 66, no. 23, pp. 4159–4165, Dec. 1994, doi: 10.1021/AC00095A008/ASSET/AC00095A008.FP.PNG_V03.

[2] N. S. Kasálková, P. Slepička, V. Švorčík, I. Rodríguez-Ramos, and M. Al-Haik, “Carbon Nanostructures, Nanolayers, and Their Composites,” *Nanomater. 2021, Vol. 11, Page 2368*, vol. 11, no. 9, p. 2368, Sep. 2021, doi: 10.3390/NANO11092368.

[3] A. Barhoum *et al.*, “A Broad Family of Carbon Nanomaterials: Classification, Properties, Synthesis, and Emerging Applications,” *Handb. Nanofibers*, pp. 1–40, 2019, doi: 10.1007/978-3-319-42789-8_59-1.

[4] D. R. Parkinson, “Analytical derivatization techniques,” *Compr. Sampl. Sample Prep. Anal. Tech. Sci.*, pp. 559–595, Dec. 2012, doi: 10.1016/B978-0-12-381373-2.00060-0.

[5] R. Maheswaran and B. P. Shanmugavel, “A Critical Review of the Role of Carbon Nanotubes in the Progress of Next-Generation Electronic Applications,” *J. Electron. Mater.*, vol. 51, no. 6, pp. 2786–2800, Jun. 2022, doi: 10.1007/S11664-022-09516-8/FIGURES/12.

[6] S. S. Ray and J. Bandyopadhyay, “Nanotechnology-enabled biomedical engineering: Current trends, future scopes, and perspectives,” *Nanotechnol. Rev.*, vol. 10, no. 1, pp. 728–743, Jan. 2021, doi: 10.1515/NTREV-2021-0052/ASSET/GRAPHIC/J_NTREV-2021-0052_FIG_013.JPG.

[7] M. Paukov, C. Kramberger, I. Begichev, M. Kharlamova, and M. Burdanova, “Functionalized Fullerenes and Their Applications in Electrochemistry, Solar Cells, and Nanoelectronics,” *Materials (Basel).*, vol. 16, no. 3, Feb. 2023, doi: 10.3390/MA16031276.

[8] H. W. Kroto, J. R. Heath, S. C. O’Brien, R. F. Curl, and R. E. Smalley, “C60: Buckminsterfullerene,” *Nat. 1985 3186042*, vol. 318, no. 6042, pp. 162–163, 1985, doi: 10.1038/318162a0.

[9] “Discovery of Fullerenes National Historic Chemical Landmark - American Chemical Society.” https://www.acs.org/education/whatischemistry/landmarks/fullerenes.html (accessed Nov. 14, 2023).

[10] R. Islam, “Novel materials,” *Nov. Mater.*, pp. 1–289, 2013, doi: 10.1016/B978-0-12-384954-0.00018-9.

[11] “The major isomers of fullerenes C 60 , C70, C76, C78, C80, C82, and... | Download Scientific Diagram.” https://www.researchgate.net/figure/The-major-isomers-of-fullerenes-C-60-C70-C76-C78-C80-C82-and-C84Reproduced-by_fig2_277575175 (accessed Nov. 14, 2023).

[12] R. Bakry *et al.*, "Medicinal applications of fullerenes," *Int. J. Nanomedicine*, vol. 2, no. 4, p. 639, 2007, Accessed: Nov. 14, 2023. [Online]. Available: /pmc/articles/PMC2676811/.

[13] R. B. Ross *et al.*, "Endohedral fullerenes for organic photovoltaic devices," *Nat. Mater.*, vol. 8, no. 3, pp. 208–212, 2009, doi: 10.1038/NMAT2379.

[14] A. K. Geim and K. S. Novoselov, "The rise of graphene," *Nat. Mater.*, vol. 6, no. 3, pp. 183–191, Mar. 2007, doi: 10.1038/NMAT1849.

[15] "The 2010 Nobel Prize in Physics - Press release - NobelPrize.org." https://www.nobelprize.org/prizes/physics/2010/press-release/ (accessed Nov. 14, 2023).

[16] V. B. Mbayachi, E. Ndayiragije, T. Sammani, S. Taj, E. R. Mbuta, and A. ullah khan, "Graphene synthesis, characterization and its applications: A review," *Results Chem.*, vol. 3, p. 100163, Jan. 2021, doi: 10.1016/J.RECHEM.2021.100163.

[17] D. G. Papageorgiou, I. A. Kinloch, and R. J. Young, "Mechanical properties of graphene and graphene-based nanocomposites," *Prog. Mater. Sci.*, vol. 90, pp. 75–127, Oct. 2017, doi: 10.1016/J.PMATSCI.2017.07.004.

[18] S. Alam, M. Asaduzzaman Chowdhury, A. Shahid, R. Alam, and A. Rahim, "Synthesis of emerging two-dimensional (2D) materials – Advances, challenges and prospects," *FlatChem*, vol. 30, p. 100305, Nov. 2021, doi: 10.1016/J.FLATC.2021.100305.

[19] S. K. Tiwari, S. Sahoo, N. Wang, and A. Huczko, "Graphene research and their outputs: Status and prospect," *J. Sci. Adv. Mater. Devices*, vol. 5, no. 1, pp. 10–29, Mar. 2020, doi: 10.1016/J.JSAMD.2020.01.006.

[20] M. Zhang and J. Li, "Carbon nanotube in different shapes," *Mater. Today*, vol. 12, no. 6, pp. 12–18, Jun. 2009, doi: 10.1016/S1369-7021(09)70176-2.

[21] C. M. Tîlmaciu and M. C. Morris, "Carbon nanotube biosensors," *Front. Chem.*, vol. 3, no. OCT, p. 162923, Oct. 2015, doi: 10.3389/FCHEM.2015.00059/BIBTEX.

[22] R. Simón-Vázquez, M. Peleteiro, T. Lozano, Á. González-Fernández, and A. Casal, "Nanotoxicology," *Front. Nanosci.*, vol. 4, no. 1, pp. 443–485, 2012, doi: 10.1016/B978-0-12-415769-9.00015-7.

[23] M. Ates, A. A. Eker, and B. Eker, "Carbon nanotube-based nanocomposites and their applications," *J. Adhes. Sci. Technol.*, vol. 31, no. 18, pp. 1977–1997, Sep. 2017, doi: 10.1080/01694243.2017.1295625.

[24] S. Nagarajaiah, R. Bruce Weisman, P. Sun, S. M. Bachilo, and Y. Yang, "Strain-Sensing Smart Skin: A Noncontact Optical Strain Sensor Using Single-Walled Carbon Nanotubes," *Innov. Dev. Adv. Multifunct. Nanocomposites Civ. Struct. Eng.*, pp. 353–375, 2016, doi: 10.1016/B978-1-

78242-326-3.00015-4.

[25] L. Natrayan *et al.*, "Reduction of 1/f Noise in Single-Walled Carbon Nanotubes (SWCNTs) Using Gas Adsorption Technique," *Adsorpt. Sci. Technol.*, vol. 2022, 2022, doi: 10.1155/2022/3244702.

[26] A. Venkataraman, E. V. Amadi, Y. Chen, and C. Papadopoulos, "Carbon Nanotube Assembly and Integration for Applications," *Nanoscale Res. Lett. 2019 141*, vol. 14, no. 1, pp. 1–47, Jul. 2019, doi: 10.1186/S11671-019-3046-3.

[27] D. Shi, G. Mi, and T. J. Webster, "The Synthesis, Application, and Related Neurotoxicity of Carbon Nanotubes," *Neurotox. Nanomater. Nanomedicine*, pp. 259–284, 2017, doi: 10.1016/B978-0-12-804598-5.00011-8.

[28] "Multi-walled carbon nanotubes (MWCNTs): (a) Parchment model, (b)... | Download Scientific Diagram." https://www.researchgate.net/figure/Multi-walled-carbon-nanotubes-MWCNTs-a-Parchment-model-b-Russian-Doll-model_fig8_317785252 (accessed Nov. 14, 2023).

[29] A. Ali, S. S. Rahimian Koloor, A. H. Alshehri, and A. Arockiarajan, "Carbon nanotube characteristics and enhancement effects on the mechanical features of polymer-based materials and structures – A review," *J. Mater. Res. Technol.*, vol. 24, pp. 6495–6521, May 2023, doi: 10.1016/J.JMRT.2023.04.072.

[30] Q. Li *et al.*, "Effect of multi-walled carbon nanotubes on mechanical, thermal and electrical properties of phenolic foam via in-situ polymerization," *Compos. Part A Appl. Sci. Manuf.*, vol. 82, pp. 214–225, Mar. 2016, doi: 10.1016/J.COMPOSITESA.2015.11.014.

[31] N. Saifuddin, A. Z. Raziah, and A. R. Junizah, "Carbon nanotubes: A review on structure and their interaction with proteins," *J. Chem.*, 2013, doi: 10.1155/2013/676815.

[32] "Electronic Structure of Carbon Nanotube – Physics at nanoscale I." https://ebooks.inflibnet.ac.in/phy12/chapter/electronic-structure-of-carbon-nanotube/ (accessed Nov. 14, 2023).

[33] "Band structure of an a 10,10 armchair and b 10,0 zigzag nanotube. and... | Download Scientific Diagram." https://www.researchgate.net/figure/Band-structure-of-an-a-10-10-armchair-and-b-10-0-zigzag-nanotube-and-denote-the-electron_fig1_228925228 (accessed Nov. 14, 2023).

[34] A. K. Zulhairun, M. S. Abdullah, A. F. Ismail, and P. S. Goh, "Graphene and CNT technology," *Curr. Trends Futur. Dev. Membr. Membr. Desalin. Syst. Next Gener.*, pp. 3–26, Jan. 2018, doi: 10.1016/B978-0-12-813551-8.00001-2.

[35] B. D. Mansuriya and Z. Altintas, "Carbon Dots: Classification, Properties, Synthesis, Characterization, and Applications in Health Care—An Updated Review (2018–2021),"

Nanomaterials, vol. 11, no. 10, p. 11, Oct. 2021, doi: 10.3390/NANO11102525.

[36] K. H. Leong, Y. H. Chin, L. C. Sim, B. Tan, C. Dai, and P. Saravanan, "Physical properties of quantum dots," *Graphene, Nanotub. Quantum Dots-Based Nanotechnol. Fundam. Appl.*, pp. 687–709, Jan. 2022, doi: 10.1016/B978-0-323-85457-3.00017-7.

[37] S. Ashok Kumar, M. Dheeraj Kumar, M. Saikia, N. Renuga Devi, and A. Subramania, "A review on plant derived carbon quantum dots for bio-imaging," *Mater. Adv.*, vol. 4, no. 18, pp. 3951–3966, Sep. 2023, doi: 10.1039/D3MA00254C.

[38] F. Yuan, S. Li, Z. Fan, X. Meng, L. Fan, and S. Yang, "Shining carbon dots: Synthesis and biomedical and optoelectronic applications," *Nano Today*, vol. 11, no. 5, pp. 565–586, Oct. 2016, doi: 10.1016/J.NANTOD.2016.08.006.

[39] D. Ozyurt, M. Al Kobaisi, R. K. Hocking, and B. Fox, "Properties, synthesis, and applications of carbon dots: A review," *Carbon Trends*, vol. 12, p. 100276, Sep. 2023, doi: 10.1016/J.CARTRE.2023.100276.

[40] A. Vibhute, T. Patil, R. Gambhir, and A. P. Tiwari, "Fluorescent carbon quantum dots: Synthesis methods, functionalization and biomedical applications," *Appl. Surf. Sci. Adv.*, vol. 11, p. 100311, Oct. 2022, doi: 10.1016/J.APSADV.2022.100311.

[41] K. Naik, S. Chaudhary, L. Ye, and A. S. Parmar, "A Strategic Review on Carbon Quantum Dots for Cancer-Diagnostics and Treatment," *Front. Bioeng. Biotechnol.*, vol. 10, May 2022, doi: 10.3389/FBIOE.2022.882100.

[42] J. Debgupta, S. Mandal, H. Kalita, M. Aslam, A. Patra, and V. Pillai, "Photophysical and photoconductivity properties of thiol-functionalized graphene–CdSe QD composites," *RSC Adv.*, vol. 4, no. 27, pp. 13788–13795, Mar. 2014, doi: 10.1039/C3RA47420H.

[43] M. J. Molaei, "The optical properties and solar energy conversion applications of carbon quantum dots: A review," *Sol. Energy*, vol. 196, pp. 549–566, Jan. 2020, doi: 10.1016/J.SOLENER.2019.12.036.

[44] M. Pourmadadi *et al.*, "Properties and application of carbon quantum dots (CQDs) in biosensors for disease detection: A comprehensive review," *J. Drug Deliv. Sci. Technol.*, vol. 80, p. 104156, Feb. 2023, doi: 10.1016/J.JDDST.2023.104156.

[45] C. Zhu *et al.*, "Recent advances in non-toxic quantum dots and their biomedical applications," *Prog. Nat. Sci. Mater. Int.*, vol. 29, no. 6, pp. 628–640, Dec. 2019, doi: 10.1016/J.PNSC.2019.11.007.

[46] V. L. John, Y. Nair, and T. P. Vinod, "Doping and Surface Modification of Carbon Quantum Dots for Enhanced Functionalities and Related Applications," *Part. Part. Syst. Charact.*, vol.

38, no. 11, p. 2100170, Nov. 2021, doi: 10.1002/PPSC.202100170.

[47] Y. Wang and A. Hu, "Carbon quantum dots: synthesis, properties and applications," *J. Mater. Chem. C*, vol. 2, no. 34, pp. 6921–6939, Aug. 2014, doi: 10.1039/C4TC00988F.

[48] A. Ilnicka, M. Skorupska, P. Kamedulski, and J. P. Lukaszewicz, "Electro-Exfoliation of Graphite to Graphene in an Aqueous Solution of Inorganic Salt and the Stabilization of Its Sponge Structure with Poly(Furfuryl Alcohol)," *Nanomater. 2019, Vol. 9, Page 971*, vol. 9, no. 7, p. 971, Jul. 2019, doi: 10.3390/NANO9070971.

[49] C. Doñate-Buendia, R. Torres-Mendieta, A. Pyatenko, E. Falomir, M. Fernández-Alonso, and G. Mínguez-Vega, "Fabrication by Laser Irradiation in a Continuous Flow Jet of Carbon Quantum Dots for Fluorescence Imaging," *ACS Omega*, vol. 3, no. 3, pp. 2735–2742, Mar. 2018, doi: 10.1021/ACSOMEGA.7B02082/ASSET/IMAGES/LARGE/AO-2017-02082J_0005.JPEG.

[50] M. J. Youh, M. Y. Jiang, M. C. Chung, H. C. Tai, and Y. Y. Li, "Formation of graphene quantum dots by ball-milling technique using carbon nanocapsules and sodium carbonate," *Inorg. Chem. Commun.*, vol. 119, p. 108061, Sep. 2020, doi: 10.1016/J.INOCHE.2020.108061.

[51] P. Kumar, S. Dua, R. Kaur, M. Kumar, and G. Bhatt, "A review on advancements in carbon quantum dots and their application in photovoltaics," *RSC Adv.*, vol. 12, no. 8, p. 4714, Feb. 2022, doi: 10.1039/D1RA08452F.

[52] V. Magesh, A. K. Sundramoorthy, and D. Ganapathy, "Recent Advances on Synthesis and Potential Applications of Carbon Quantum Dots," *Front. Mater.*, vol. 9, p. 906838, Jul. 2022, doi: 10.3389/FMATS.2022.906838/BIBTEX.

[53] H. L. Yang *et al.*, "Carbon quantum dots: Preparation, optical properties, and biomedical applications," *Mater. Today Adv.*, vol. 18, p. 100376, Jun. 2023, doi: 10.1016/J.MTADV.2023.100376.

[54] N. Azam, M. Najabat Ali, and T. Javaid Khan, "Carbon Quantum Dots for Biomedical Applications: Review and Analysis," *Front. Mater.*, vol. 8, p. 700403, Aug. 2021, doi: 10.3389/FMATS.2021.700403/BIBTEX.

[55] M. Bayazeed Alam *et al.*, "Deciphering interaction between chlorophyll functionalized carbon quantum dots with arsenic and mercury toxic metals in water as highly sensitive dual-probe sensor," *J. Photochem. Photobiol. A Chem.*, vol. 431, p. 114059, Oct. 2022, doi: 10.1016/J.JPHOTOCHEM.2022.114059.

[56] A. Sachdev and P. Gopinath, "Green synthesis of multifunctional carbon dots from coriander leaves and their potential application as antioxidants, sensors and bioimaging agents," *Analyst*,

vol. 140, no. 12, pp. 4260–4269, Jun. 2015, doi: 10.1039/C5AN00454C.

[57] A. Nair, J. T. Haponiuk, S. Thomas, and S. Gopi, "Natural carbon-based quantum dots and their applications in drug delivery: A review," *Biomed. Pharmacother.*, vol. 132, p. 110834, Dec. 2020, doi: 10.1016/J.BIOPHA.2020.110834.

[58] J. Zhou, Z. Sheng, H. Han, M. Zou, and C. Li, "Facile synthesis of fluorescent carbon dots using watermelon peel as a carbon source," *Mater. Lett.*, vol. 66, no. 1, pp. 222–224, Jan. 2012, doi: 10.1016/J.MATLET.2011.08.081.

[59] D. Bano, V. Kumar, V. K. Singh, and S. H. Hasan, "Green synthesis of fluorescent carbon quantum dots for the detection of mercury(ii) and glutathione," *New J. Chem.*, vol. 42, no. 8, pp. 5814–5821, 2018, doi: 10.1039/c8nj00432c.

[60] S. Ghosh, K. Ghosal, S. A. Mohammad, and K. Sarkar, "Dendrimer functionalized carbon quantum dot for selective detection of breast cancer and gene therapy," *Chem. Eng. J.*, vol. 373, pp. 468–484, Oct. 2019, doi: 10.1016/J.CEJ.2019.05.023.

[61] R. Riaz *et al.*, "Dye-sensitized solar cell (DSSC) coated with energy down shift layer of nitrogen-doped carbon quantum dots (N-CQDs) for enhanced current density and stability," *Appl. Surf. Sci.*, vol. 483, pp. 425–431, Jul. 2019, doi: 10.1016/J.APSUSC.2019.03.236.

[62] M. Sabet and K. Mahdavi, "Green synthesis of high photoluminescence nitrogen-doped carbon quantum dots from grass via a simple hydrothermal method for removing organic and inorganic water pollutions," *Appl. Surf. Sci.*, vol. 463, pp. 283–291, Jan. 2019, doi: 10.1016/J.APSUSC.2018.08.223.

[63] S. A. A. Vandarkuzhali *et al.*, "Pineapple Peel-Derived Carbon Dots: Applications as Sensor, Molecular Keypad Lock, and Memory Device," *ACS Omega*, vol. 3, no. 10, pp. 12584–12592, Oct. 2018, doi: 10.1021/ACSOMEGA.8B01146/ASSET/IMAGES/LARGE/AO-2018-01146E_0010.JPEG.

[64] S. D. Torres Landa, N. K. Reddy Bogireddy, I. Kaur, V. Batra, and V. Agarwal, "Heavy metal ion detection using green precursor derived carbon dots," *iScience*, vol. 25, no. 2, Feb. 2022, doi: 10.1016/J.ISCI.2022.103816.

[65] Y. J. Zhu and F. Chen, "Microwave-assisted preparation of inorganic nanostructures in liquid phase," *Chem. Rev.*, vol. 114, no. 12, pp. 6462–6555, Jun. 2014, doi: 10.1021/CR400366S/ASSET/IMAGES/MEDIUM/CR-2013-00366S_0044.GIF.

[66] G. J. Owens *et al.*, "Sol–gel based materials for biomedical applications," *Prog. Mater. Sci.*, vol. 77, pp. 1–79, Apr. 2016, doi: 10.1016/J.PMATSCI.2015.12.001.

[67] N. Soltani, A. Bahrami, L. Giebeler, T. Gemming, and D. Mikhailova, "Progress and challenges

in using sustainable carbon anodes in rechargeable metal-ion batteries," *Prog. Energy Combust. Sci.*, vol. 87, p. 100929, Nov. 2021, doi: 10.1016/J.PECS.2021.100929.

[68] "Chemical Vapor Deposition," *Handb. Nanophase Nanostructured Mater.*, pp. 102–144, 2003, doi: 10.1007/0-387-23814-X_5.

[69] D. Rocco, V. G. Moldoveanu, M. Feroci, M. Bortolami, and F. Vetica, "Electrochemical Synthesis of Carbon Quantum Dots," *ChemElectroChem*, vol. 10, no. 3, p. e202201104, Feb. 2023, doi: 10.1002/CELC.202201104.

[70] S. Ying *et al.*, "Green synthesis of nanoparticles: Current developments and limitations," *Environ. Technol. Innov.*, vol. 26, p. 102336, May 2022, doi: 10.1016/J.ETI.2022.102336.

[71] P. B. Santhosh, J. Genova, and H. Chamati, "Green Synthesis of Gold Nanoparticles: An Eco-Friendly Approach," *Chem. 2022, Vol. 4, Pages 345-369*, vol. 4, no. 2, pp. 345–369, Apr. 2022, doi: 10.3390/CHEMISTRY4020026.

[72] K. Parveen, V. Banse, and L. Ledwani, "Green synthesis of nanoparticles: Their advantages and disadvantages," *AIP Conf. Proc.*, vol. 1724, no. 1, Apr. 2016, doi: 10.1063/1.4945168/580977.

[73] V. K. Sharma, R. A. Yngard, and Y. Lin, "Silver nanoparticles: Green synthesis and their antimicrobial activities," *Adv. Colloid Interface Sci.*, vol. 145, no. 1–2, pp. 83–96, Jan. 2009, doi: 10.1016/J.CIS.2008.09.002.

[74] Ł. Janus, J. Radwan-Pragłowska, M. Piatkowski, and D. Bogdał, "Facile Synthesis of Surface-Modified Carbon Quantum Dots (CQDs) for Biosensing and Bioimaging," *Materials (Basel).*, vol. 13, no. 15, Aug. 2020, doi: 10.3390/MA13153313.

[75] D. Benner, P. Yadav, and D. Bhatia, "Red emitting carbon dots: surface modifications and bioapplications," *Nanoscale Adv.*, vol. 5, no. 17, pp. 4337–4353, Aug. 2023, doi: 10.1039/D3NA00469D.

[76] P. K. Yadav, S. Chandra, V. Kumar, D. Kumar, and S. H. Hasan, "Carbon Quantum Dots: Synthesis, Structure, Properties, and Catalytic Applications for Organic Synthesis," *Catal. 2023, Vol. 13, Page 422*, vol. 13, no. 2, p. 422, Feb. 2023, doi: 10.3390/CATAL13020422.

[77] A. Al Ragib *et al.*, "Multifunctional carbon dots in nanomaterial surface modification: a descriptive review," *Carbon Res. 2023 21*, vol. 2, no. 1, pp. 1–30, Oct. 2023, doi: 10.1007/S44246-023-00069-X.

[78] H. H. Jing *et al.*, "Green Carbon Dots: Synthesis, Characterization, Properties and Biomedical Applications," *J. Funct. Biomater. 2023, Vol. 14, Page 27*, vol. 14, no. 1, p. 27, Jan. 2023, doi: 10.3390/JFB14010027.

[79] B. L. Martin, "Regulation by Covalent Modification," *eLS*, Aug. 2014, doi:

10.1002/9780470015902.A0000866.PUB3.

[80] S. Šafranko *et al.*, "An Overview of the Recent Developments in Carbon Quantum Dots—Promising Nanomaterials for Metal Ion Detection and (Bio)Molecule Sensing," *Chemosens. 2021, Vol. 9, Page 138*, vol. 9, no. 6, p. 138, Jun. 2021, doi: 10.3390/CHEMOSENSORS9060138.

[81] P. Kumar, S. Dua, R. Kaur, M. Kumar, and G. Bhatt, "A review on advancements in carbon quantum dots and their application in photovoltaics," *RSC Adv.*, vol. 12, no. 8, pp. 4714–4759, Feb. 2022, doi: 10.1039/D1RA08452F.

[82] C. Qi, H. Wang, A. Yang, X. Wang, and J. Xu, "Facile Fabrication of Highly Fluorescent N-Doped Carbon Quantum Dots Using an Ultrasonic-Assisted Hydrothermal Method: Optical Properties and Cell Imaging," *ACS Omega*, vol. 6, no. 48, pp. 32904–32916, Dec. 2021, doi: 10.1021/ACSOMEGA.1C04903/ASSET/IMAGES/MEDIUM/AO1C04903_M002.GIF.

[83] I. Singh, R. Arora, H. Dhiman, and R. Pahwa, "Carbon Quantum Dots: Synthesis, Characterization and Biomedical Applications," *Turkish J. Pharm. Sci.*, vol. 15, no. 2, p. 219, Aug. 2018, doi: 10.4274/TJPS.63497.

[84] Y. Deng *et al.*, "Visible-Ultraviolet Upconversion Carbon Quantum Dots for Enhancement of the Photocatalytic Activity of Titanium Dioxide," *ACS Omega*, vol. 6, no. 6, pp. 4247–4254, Feb. 2021, doi: 10.1021/ACSOMEGA.0C05182/ASSET/IMAGES/LARGE/AO0C05182_0006.JPEG.

[85] M. Bayazeed Alam *et al.*, "Deciphering interaction between chlorophyll functionalized carbon quantum dots with arsenic and mercury toxic metals in water as highly sensitive dual-probe sensor," *J. Photochem. Photobiol. A Chem.*, vol. 431, Oct. 2022, doi: 10.1016/j.jphotochem.2022.114059.

[86] "UV-Vis absorption spectra of Si-CQDs at various a temperature and b pHs... | Download Scientific Diagram." https://www.researchgate.net/figure/UV-Vis-absorption-spectra-of-Si-CQDs-at-various-a-temperature-and-b-pHs-of-hydrothermal_fig4_340206753 (accessed Nov. 15, 2023).

[87] "UV-Vis spectrum of carbon dots showing the absorption peak at 280 nm.... | Download Scientific Diagram." https://www.researchgate.net/figure/UV-Vis-spectrum-of-carbon-dots-showing-the-absorption-peak-at-280-nm-Inset-Photograph_fig4_357298373 (accessed Nov. 15, 2023).

[88] A. Abbas, T. A. Tabish, S. J. Bull, T. M. Lim, and A. N. Phan, "High yield synthesis of graphene quantum dots from biomass waste as a highly selective probe for Fe3+ sensing," *Sci. Reports 2020 101*, vol. 10, no. 1, pp. 1–16, Dec. 2020, doi: 10.1038/s41598-020-78070-2.

[89] V. M. Gerrish, "Characterization and Quantification of Detector Performance," *Semicond. Semimetals*, vol. 43, no. C, pp. 493–530, Jan. 1995, doi: 10.1016/S0080-8784(08)62752-0.

[90] H. Shabbir and M. Wojnicki, "Recent Progress of Non-Cadmium and Organic Quantum Dots for Optoelectronic Applications with a Focus on Photodetector Devices," *Electron. 2023, Vol. 12, Page 1327*, vol. 12, no. 6, p. 1327, Mar. 2023, doi: 10.3390/ELECTRONICS12061327.

[91] A. Kaur, K. Pandey, R. Kaur, N. Vashishat, and M. Kaur, "Nanocomposites of Carbon Quantum Dots and Graphene Quantum Dots: Environmental Applications as Sensors," *Chemosens. 2022, Vol. 10, Page 367*, vol. 10, no. 9, p. 367, Sep. 2022, doi: 10.3390/CHEMOSENSORS10090367.

[92] H. B. A. Sousa, C. S. M. Martins, and J. A. V. Prior, "You Don't Learn That in School: An Updated Practical Guide to Carbon Quantum Dots," *Nanomaterials*, vol. 11, no. 3, pp. 1–88, Mar. 2021, doi: 10.3390/NANO11030611.

[93] E. Dhandapani, N. Duraisamy, and R. Mohan Raj, "Green synthesis of carbon quantum dots from food waste," *Mater. Today Proc.*, vol. 51, pp. 1696–1700, Jan. 2022, doi: 10.1016/J.MATPR.2020.10.025.

[94] V. Georgakilas, J. A. Perman, J. Tucek, and R. Zboril, "Broad Family of Carbon Nanoallotropes: Classification, Chemistry, and Applications of Fullerenes, Carbon Dots, Nanotubes, Graphene, Nanodiamonds, and Combined Superstructures," *Chem. Rev.*, vol. 115, no. 11, pp. 4744–4822, Jun. 2015, doi: 10.1021/CR500304F/ASSET/IMAGES/MEDIUM/CR-2014-00304F_0081.GIF.

[95] B. D. Mansuriya and Z. Altintas, "Carbon Dots: Classification, Properties, Synthesis, Characterization, and Applications in Health Care—An Updated Review (2018–2021)," *Nanomaterials*, vol. 11, no. 10, p. 11, Oct. 2021, doi: 10.3390/NANO11102525.

[96] W. Kong, H. Wu, Z. Ye, R. Li, T. Xu, and B. Zhang, "Optical properties of pH-sensitive carbon-dots with different modifications," *J. Lumin.*, vol. 148, pp. 238–242, Apr. 2014, doi: 10.1016/J.JLUMIN.2013.12.007.

[97] Y. Park, S. Jeong, and S. Kim, "Medically translatable quantum dots for biosensing and imaging," *J. Photochem. Photobiol. C Photochem. Rev.*, vol. 30, pp. 51–70, Mar. 2017, doi: 10.1016/J.JPHOTOCHEMREV.2017.01.002.

[98] P. Ge, K. Sun, and Y. Cheng, "Design and synthesis of up-converted persistent luminescence Zn3Ga2SnO8:Cr3+, Yb3+, Er3+ phosphor," *Optik (Stuttg).*, vol. 188, pp. 200–204, Jul. 2019, doi: 10.1016/J.IJLEO.2019.05.011.

[99] A. Kumar, S. P. Tiwari, H. C. Swart, and J. C. G. Esteves da Silva, "Infrared interceded YF3: Er3+/Yb3+ upconversion phosphor for crime scene and anti-counterfeiting applications," *Opt.*

Mater. (Amst)., vol. 92, pp. 347–351, Jun. 2019, doi: 10.1016/J.OPTMAT.2019.04.050.

[100] N. Zhang *et al.*, "Cell Imaging Using Two-Photon Excited CdS Fluorescent Quantum Dots Working within the Biological Window," *Nanomaterials*, vol. 9, no. 3, Mar. 2019, doi: 10.3390/NANO9030369.

[101] H. H. Jing *et al.*, "Green Carbon Dots: Synthesis, Characterization, Properties and Biomedical Applications," *J. Funct. Biomater. 2023, Vol. 14, Page 27*, vol. 14, no. 1, p. 27, Jan. 2023, doi: 10.3390/JFB14010027.

[102] L. Cui, X. Ren, M. Sun, H. Liu, and L. Xia, "Carbon Dots: Synthesis, Properties and Applications," *Nanomaterials*, vol. 11, no. 12, Dec. 2021, doi: 10.3390/NANO11123419.

[103] Swathilakshmi and S. Anandhan, "Recent development in carbon dot-based gas sensors," *Sensors & Diagnostics*, vol. 1, no. 5, pp. 902–931, Sep. 2022, doi: 10.1039/D2SD00074A.

[104] T. Nandy, R. A. Coutu, and C. Ababei, "Carbon Monoxide Sensing Technologies for Next-Generation Cyber-Physical Systems," *Sensors (Basel).*, vol. 18, no. 10, Oct. 2018, doi: 10.3390/S18103443.

[105] G. Xu, F. Wei, Y. Cen, X. Cheng, and Q. Hu, "Dual-Emissive Fluorescent Sensor Based on Functionalized Quantum Dots for the Simultaneous Determination of Nitric Oxide and Hydrogen Sulfide," *ACS Biomater. Sci. Eng.*, vol. 6, no. 11, pp. 6086–6094, Nov. 2020, doi: 10.1021/ACSBIOMATERIALS.0C00842/ASSET/IMAGES/LARGE/AB0C00842_0008.JPEG.

[106] A. K. Verma, A. Noumani, A. K. Yadav, and P. R. Solanki, "FRET Based Biosensor: Principle Applications Recent Advances and Challenges," *Diagnostics 2023, Vol. 13, Page 1375*, vol. 13, no. 8, p. 1375, Apr. 2023, doi: 10.3390/DIAGNOSTICS13081375.

[107] M. Deng *et al.*, "Ultrasensitive Label-Free DNA Detection Based on Solution-Gated Graphene Transistors Functionalized with Carbon Quantum Dots," *Anal. Chem.*, vol. 94, no. 7, pp. 3320–3327, Feb. 2022, doi: 10.1021/ACS.ANALCHEM.1C05309/ASSET/IMAGES/LARGE/AC1C05309_0006.JPEG.

[108] P. Devi, P. Rajput, A. Thakur, K. H. Kim, and P. Kumar, "Recent advances in carbon quantum dot-based sensing of heavy metals in water," *TrAC Trends Anal. Chem.*, vol. 114, pp. 171–195, May 2019, doi: 10.1016/J.TRAC.2019.03.003.

[109] D. Gu, S. Shang, Q. Yu, and J. Shen, "Green synthesis of nitrogen-doped carbon dots from lotus root for Hg(II) ions detection and cell imaging," *Appl. Surf. Sci.*, vol. 390, pp. 38–42, Dec. 2016, doi: 10.1016/J.APSUSC.2016.08.012.

[110] H. Huang *et al.*, "One-pot green synthesis of nitrogen-doped carbon nanoparticles as fluorescent

probes for mercury ions," *RSC Adv.*, vol. 3, no. 44, pp. 21691–21696, Oct. 2013, doi: 10.1039/C3RA43452D.

[111] Z. Liu *et al.*, "Ratiometric fluorescent sensing of Pb2+ and Hg2+ with two types of carbon dot nanohybrids synthesized from the same biomass," *Sensors Actuators, B Chem.*, vol. 296, Oct. 2019, doi: 10.1016/J.SNB.2019.126698.

[112] K. Raji, V. Ramanan, and P. Ramamurthy, "Facile and green synthesis of highly fluorescent nitrogen-doped carbon dots from jackfruit seeds and its applications towards the fluorimetric detection of Au3+ ions in aqueous medium and in in vitro multicolor cell imaging," *New J. Chem.*, vol. 43, no. 29, pp. 11710–11719, Jul. 2019, doi: 10.1039/C9NJ02590A.

[113] N. Wang, Y. Wang, T. Guo, T. Yang, M. Chen, and J. Wang, "Green preparation of carbon dots with papaya as carbon source for effective fluorescent sensing of Iron (III) and Escherichia coli," *Biosens. Bioelectron.*, vol. 85, pp. 68–75, Nov. 2016, doi: 10.1016/J.BIOS.2016.04.089.

[114] H. Wang *et al.*, "Carbon dots promote the growth and photosynthesis of mung bean sprouts," *Carbon N. Y.*, vol. 136, pp. 94–102, Sep. 2018, doi: 10.1016/J.CARBON.2018.04.051.

[115] S. Bhatt, M. Bhatt, A. Kumar, G. Vyas, T. Gajaria, and P. Paul, "Green route for synthesis of multifunctional fluorescent carbon dots from Tulsi leaves and its application as Cr(VI) sensors, bio-imaging and patterning agents," *Colloids Surfaces B Biointerfaces*, vol. 167, pp. 126–133, Jul. 2018, doi: 10.1016/J.COLSURFB.2018.04.008.

[116] D. C. T. Nguyen, B. S. Kim, G. H. Oh, V. P. Vu, S. Kim, and S. H. Lee, "Incorporation of carbon quantum dots with PEDOT:PSS for high-performance inverted organic solar cells," *Synth. Met.*, vol. 298, p. 117430, Sep. 2023, doi: 10.1016/J.SYNTHMET.2023.117430.

[117] Y. J. Tong *et al.*, "High-quality full-color carbon quantum dots synthesized under an unprecedentedly mild condition," *iScience*, vol. 25, no. 6, 2022, doi: 10.1016/j.isci.2022.104421.

[118] B. Zhao and Z. Tan, "Fluorescent Carbon Dots: Fantastic Electroluminescent Materials for Light-Emitting Diodes," *Adv. Sci.*, vol. 8, no. 7, p. 2001977, Apr. 2021, doi: 10.1002/ADVS.202001977.

[119] J. Gan *et al.*, "Defects, photophysics and passivation in Pb-based colloidal quantum dot photovoltaics," *Mater. Today Nano*, vol. 13, p. 100101, Mar. 2021, doi: 10.1016/J.MTNANO.2020.100101.

[120] S. Ashok Kumar, M. Dheeraj Kumar, M. Saikia, N. Renuga Devi, and A. Subramania, "A review on plant derived carbon quantum dots for bio-imaging," *Mater. Adv.*, vol. 4, no. 18, pp. 3951–3966, Sep. 2023, doi: 10.1039/D3MA00254C.

[121] L. Dirheimer, T. Pons, F. Marchal, and L. Bezdetnaya, "Quantum Dots Mediated Imaging and Phototherapy in Cancer Spheroid Models: State of the Art and Perspectives," *Pharmaceutics*, vol. 14, no. 10, Oct. 2022, doi: 10.3390/PHARMACEUTICS14102136.

[122] A. S. Dezfuli, E. Kohan, S. Tehrani Fateh, N. Alimirzaei, H. Arzaghi, and M. R. Hamblin, "Organic dots (O-dots) for theranostic applications: preparation and surface engineering," *RSC Adv.*, vol. 11, no. 4, pp. 2253–2291, Jan. 2021, doi: 10.1039/D0RA08041A.

[123] S. T. Yang *et al.*, "Carbon Dots as Nontoxic and High-Performance Fluorescence Imaging Agents," *J. Phys. Chem. C. Nanomater. Interfaces*, vol. 113, no. 42, p. 18110, Sep. 2009, doi: 10.1021/JP9085969.

[124] D. Kobat *et al.*, "Deep tissue multiphoton microscopy using longer wavelength excitation," *Opt. Express, Vol. 17, Issue 16, pp. 13354-13364*, vol. 17, no. 16, pp. 13354–13364, Aug. 2009, doi: 10.1364/OE.17.013354.

[125] M. J. Molaei, "Carbon quantum dots and their biomedical and therapeutic applications: a review," *RSC Adv.*, vol. 9, no. 12, pp. 6460–6481, Feb. 2019, doi: 10.1039/C8RA08088G.

[126] S. F. Ou *et al.*, "N-Doped Carbon Quantum Dots as Fluorescent Bioimaging Agents," *Cryst. 2021, Vol. 11, Page 789*, vol. 11, no. 7, p. 789, Jul. 2021, doi: 10.3390/CRYST11070789.

[127] S. Karthik, B. Saha, S. Kumar Ghosh, and N. D. Pradeep Singh, "Photoresponsive quinoline tethered fluorescent carbon dots for regulated anticancer drug delivery † ChemComm," *Chem. Commun*, vol. 49, pp. 10471–10473, 2013, doi: 10.1039/c3cc46078a.

[128] M. S. Khan, S. Pandey, A. Talib, M. L. Bhaisare, and H. F. Wu, "Controlled delivery of dopamine hydrochloride using surface modified carbon dots for neuro diseases," *Colloids Surf. B. Biointerfaces*, vol. 134, pp. 140–146, Oct. 2015, doi: 10.1016/J.COLSURFB.2015.06.006.

[129] C. L. Shen *et al.*, "Recent progress of carbon dots in targeted bioimaging and cancer therapy," *Theranostics*, vol. 12, no. 6, pp. 2860–2893, 2022, doi: 10.7150/THNO.70721.

[130] N. Azam, M. Najabat Ali, and T. Javaid Khan, "Carbon Quantum Dots for Biomedical Applications: Review and Analysis," *Front. Mater.*, vol. 8, p. 272, Aug. 2021, doi: 10.3389/FMATS.2021.700403/BIBTEX.

[131] S. Lu *et al.*, "Facile and ultrasensitive fluorescence sensor platform for tumor invasive biomaker β-glucuronidase detection and inhibitor evaluation with carbon quantum dots based on inner-filter effect," *Biosens. Bioelectron.*, vol. 85, pp. 358–362, Nov. 2016, doi: 10.1016/J.BIOS.2016.05.021.

[132] C. Biao Kong *et al.*, "Carbon Dot-Based Inorganic–Organic Nanosystem for Two-Photon Imaging and Biosensing of pH Variation in Living Cells and Tissues," *Adv. Mater.*, vol. 24, no.

43, pp. 5844–5848, Nov. 2012, doi: 10.1002/ADMA.201202599.

[133] A. R. Abubakar and M. Haque, "Preparation of Medicinal Plants: Basic Extraction and Fractionation Procedures for Experimental Purposes," *J. Pharm. Bioallied Sci.*, vol. 12, no. 1, p. 1, Jan. 2020, doi: 10.4103/JPBS.JPBS_175_19.

[134] "A Review on the Extraction Methods Use in Medicinal Plants, Principle, Strength and Limitation." https://www.longdom.org/open-access/a-review-on-the-extraction-methods-use-in-medicinal-plants-principle-strength-and-limitation-2167-0412-1000196.pdf (accessed Dec. 14, 2022).

[135] "Instrumentation for Fluorescence Spectroscopy," *Princ. Fluoresc. Spectrosc.*, pp. 27–61, 2006, doi: 10.1007/978-0-387-46312-4_2.

[136] A. Sachdev and P. Gopinath, "Green synthesis of multifunctional carbon dots from coriander leaves and their potential application as antioxidants, sensors and bioimaging agents," *Analyst*, vol. 140, no. 12, pp. 4260–4269, Jun. 2015, doi: 10.1039/C5AN00454C.

[137] J. R. Lakowicz, "Principles of Fluorescence Spectroscopy," *Princ. Fluoresc. Spectrosc.*, 1999, doi: 10.1007/978-1-4757-3061-6.

[138] A. A. Ala, B. B. Olotu, and C. M. D. Ohia, "Assessment of cytotoxicity of leaf extracts of Andrographis paniculata and Aspilia africana on murine cells in vitro," *Arch. basic Appl. Med.*, vol. 6, no. 1, p. 61, Feb. 2018, Accessed: Mar. 25, 2023. [Online]. Available: /pmc/articles/PMC6141048/.

[139] D. Mohapatra *et al.*, "In Vitro Cancer Cell Imaging, Free Radical Scavenging, and Fe3+ Sensing Activity of Green Synthesized Carbon Dots from Leaves of Piper longum," *J. Clust. Sci.*, pp. 1–22, Jul. 2022, doi: 10.1007/S10876-022-02303-9/FIGURES/6.

[140] R. B. Sawant, S. K. Jathar, S. B. Rajadhyaksha, and P. T. Kadam, "Red cell hemolysis during processing and storage," *Asian J. Transfus. Sci.*, vol. 1, no. 2, p. 47, 2007, doi: 10.4103/0973-6247.33446.

[141] F. Zhang, X. Feng, Y. Zhang, L. Yan, Y. Yang, and X. Liu, "Photoluminescent carbon quantum dots as a directly film-forming phosphor towards white LEDs," *Nanoscale*, vol. 8, no. 16, pp. 8618–8632, Apr. 2016, doi: 10.1039/C5NR08838K.

[142] L. H. Mao, W. Q. Tang, Z. Y. Deng, S. S. Liu, C. F. Wang, and S. Chen, "Facile access to white fluorescent carbon dots toward light-emitting devices," *Ind. Eng. Chem. Res.*, vol. 53, no. 15, pp. 6417–6425, Apr. 2014, doi: 10.1021/IE500602N/SUPPL_FILE/IE500602N_SI_001.PDF.

[143] X. Guo, C. F. Wang, Z. Y. Yu, L. Chen, and S. Chen, "Facile access to versatile fluorescent carbon dots toward light-emitting diodes," *Chem. Commun.*, vol. 48, no. 21, pp. 2692–2694,

Feb. 2012, doi: 10.1039/C2CC17769B.

[144] W. Kwon, G. Lee, S. Do, T. Joo, and S. W. Rhee, "Size-Controlled Soft-Template Synthesis of Carbon Nanodots toward Versatile Photoactive Materials," *Small*, vol. 10, no. 3, pp. 506–513, Feb. 2014, doi: 10.1002/SMLL.201301770.

[145] X. T. Feng, F. Zhang, Y. L. Wang, Y. Zhang, Y. Z. Yang, and X. G. Liu, "Luminescent carbon quantum dots with high quantum yield as a single white converter for white light emitting diodes," *Appl. Phys. Lett.*, vol. 107, no. 21, p. 213102, Nov. 2015, doi: 10.1063/1.4936234.

[146] B. A. Pulaski and S. Ostrand-Rosenberg, "Mouse 4T1 breast tumor model," *Curr. Protoc. Immunol.*, vol. Chapter 20, no. 1, Oct. 2001, doi: 10.1002/0471142735.IM2002S39.

[147] E. García-Robledo, A. Corzo, and S. Papaspyrou, "A fast and direct spectrophotometric method for the sequential determination of nitrate and nitrite at low concentrations in small volumes," *Mar. Chem.*, vol. 162, pp. 30–36, May 2014, doi: 10.1016/J.MARCHEM.2014.03.002.

[148] P. M. Kakkar, ; Balla, and B. H. Das & P N Viswanathan, "A Modified Spectrophotometric Assay of Superoxide Dismutase," *IJBB Vol.21(2) [April 1984]*, pp. 130–132, 1984, Accessed: Nov. 18, 2023. [Online]. Available: http://nopr.niscpr.res.in/handle/123456789/19932.

[149] V. Jurisic, S. Radenkovic, and G. Konjevic, "The Actual Role of LDH as Tumor Marker, Biochemical and Clinical Aspects," *Adv. Exp. Med. Biol.*, vol. 867, pp. 115–224, 2015, doi: 10.1007/978-94-017-7215-0_8.

[150] J. W. Gronwald and K. L. Plaisance, "Isolation and Characterization of Glutathione S-Transferase Isozymes from Sorghum," *Plant Physiol.*, vol. 117, no. 3, p. 877, 1998, doi: 10.1104/PP.117.3.877.

[151] W. M. Warren-Vega, A. Campos-Rodríguez, A. I. Zárate-Guzmán, and L. A. Romero-Cano, "A Current Review of Water Pollutants in American Continent: Trends and Perspectives in Detection, Health Risks, and Treatment Technologies," *Int. J. Environ. Res. Public Health*, vol. 20, no. 5, p. 4499, Mar. 2023, doi: 10.3390/IJERPH20054499/S1.

[152] J. J. Kim, Y. S. Kim, and V. Kumar, "Heavy metal toxicity: An update of chelating therapeutic strategies," *J. Trace Elem. Med. Biol.*, vol. 54, pp. 226–231, Jul. 2019, doi: 10.1016/J.JTEMB.2019.05.003.

[153] R. Xia, J. Zhou, H. Cui, J. Liang, Q. Liu, and J. Zhou, "Nodes play a major role in cadmium (Cd) storage and redistribution in low-Cd-accumulating rice (Oryza sativa L.) cultivars," *Sci. Total Environ.*, vol. 859, p. 160436, Feb. 2023, doi: 10.1016/J.SCITOTENV.2022.160436.

[154] "ATSDR - 2007 CERCLA Priority List of Hazardous Substances." https://www.atsdr.cdc.gov/spl/previous/07list.html (accessed Dec. 12, 2022).

[155] Z. Drobna, M. Styblo, and D. J. Thomas, "An Overview of Arsenic Metabolism and Toxicity," *Curr. Protoc. Toxicol.*, vol. 42, no. 431, Nov. 2009, doi: 10.1002/0471140856.TX0431S42.

[156] K. M. McCarty, H. T. Hanh, and K. W. Kim, "Arsenic geochemistry and human health in South East Asia," *Rev. Environ. Health*, vol. 26, no. 1, p. 71, Mar. 2011, doi: 10.1515/REVEH.2011.010.

[157] D. Chakraborti *et al.*, "Groundwater arsenic contamination in Bangladesh-21 Years of research," *J. Trace Elem. Med. Biol.*, vol. 31, pp. 237–248, Jul. 2015, doi: 10.1016/j.jtemb.2015.01.003.

[158] M. Argos, H. Ahsan, and J. H. Graziano, "ARSENIC AND HUMAN HEALTH: EPIDEMIOLOGIC PROGRESS AND PUBLIC HEALTH IMPLICATIONS," *Rev. Environ. Health*, vol. 27, no. 4, p. 191, Dec. 2012, doi: 10.1515/REVEH-2012-0021.

[159] M. K. Ahmed, M. Habibullah-Al-Mamun, E. Parvin, M. S. Akter, and M. S. Khan, "Arsenic induced toxicity and histopathological changes in gill and liver tissue of freshwater fish, tilapia (Oreochromis mossambicus)," *Exp. Toxicol. Pathol.*, vol. 65, no. 6, pp. 903–909, Sep. 2013, doi: 10.1016/j.etp.2013.01.003.

[160] "Electricity and the environment - U.S. Energy Information Administration (EIA)." https://www.eia.gov/energyexplained/electricity/electricity-and-the-environment.php (accessed Dec. 12, 2022).

[161] "Mercury Contamination of Aquatic Environments | U.S. Geological Survey." https://www.usgs.gov/special-topics/water-science-school/science/mercury-contamination-aquatic-environments#overview (accessed Dec. 12, 2022).

[162] R. A. Brightbill, K. Riva-Murray, M. D. Bilger, and J. D. Byrnes, "Total mercury and methylmercury in fish fillets, water, and bed sediments from selected streams in the Delaware River basin, New Jersey, New York, and Pennsylvania, 1998-2001," *Water-Resources Investig. Rep.*, 2004, doi: 10.3133/WRI034183.

[163] P. B. Tchounwou, C. G. Yedjou, A. K. Patlolla, and D. J. Sutton, "Heavy Metals Toxicity and the Environment," *EXS*, vol. 101, p. 133, 2012, doi: 10.1007/978-3-7643-8340-4_6.

[164] J. Lian, Q. Xu, Y. Wang, and F. Meng, "Recent Developments in Fluorescent Materials for Heavy Metal Ions Analysis From the Perspective of Forensic Chemistry," *Front. Chem.*, vol. 8, p. 1016, Nov. 2020, doi: 10.3389/FCHEM.2020.593291/BIBTEX.

[165] Y.-H. Shin, M. T. Gutierrez-Wing, and J.-W. Choi, "Review—Recent Progress in Portable Fluorescence Sensors," *J. Electrochem. Soc.*, vol. 168, no. 1, p. 017502, Jan. 2021, doi: 10.1149/1945-7111/ABD494.

[166] S. Weiss, "Fluorescence spectroscopy of single biomolecules," *Science (80-.).*, vol. 283, no.

5408, pp. 1676–1683, Mar. 1999, doi: 10.1126/SCIENCE.283.5408.1676/ASSET/66720D88-3AF7-49CB-93DA-0E2391FBAA00/ASSETS/GRAPHIC/SE1097317006.JPEG.

[167] Q. Hu, X. Gong, L. Liu, and M. M. F. Choi, "Characterization and Analytical Separation of Fluorescent Carbon Nanodots," *J. Nanomater.*, vol. 2017, 2017, doi: 10.1155/2017/1804178.

[168] H. Wang, S. Mukherjee, J. Yi, P. Banerjee, Q. Chen, and S. Zhou, "Biocompatible Chitosan-Carbon Dot Hybrid Nanogels for NIR-Imaging-Guided Synergistic Photothermal-Chemo Therapy," *ACS Appl. Mater. Interfaces*, vol. 9, no. 22, pp. 18639–18649, Jun. 2017, doi: 10.1021/ACSAMI.7B06062/SUPPL_FILE/AM7B06062_SI_001.PDF.

[169] G. Gao, Y. W. Jiang, H. R. Jia, J. Yang, and F. G. Wu, "On-off-on fluorescent nanosensor for Fe3+ detection and cancer/normal cell differentiation via silicon-doped carbon quantum dots," *Carbon N. Y.*, vol. 134, pp. 232–243, Aug. 2018, doi: 10.1016/J.CARBON.2018.02.063.

[170] J.-H. Liu, S.-T. Yang, X.-X. Chen, and H. Wang, "Fluorescent carbon dots and nanodiamonds for biological imaging: preparation, application, pharmacokinetics and toxicity," *Curr. Drug Metab.*, vol. 13, no. 8, pp. 1046–1056, Sep. 2012, doi: 10.2174/138920012802850083.

[171] M. D. Celiz, L. A. Colón, D. F. Watson, and D. S. Aga, "Study on the effects of humic and fulvic acids on quantum dot nanoparticles using capillary electrophoresis with laser-induced fluorescence detection," *Environ. Sci. Technol.*, vol. 45, no. 7, pp. 2917–2924, Apr. 2011, doi: 10.1021/ES1031097/SUPPL_FILE/ES1031097_SI_001.PDF.

[172] H. Chung, K. S. Cho, W. K. Koh, D. Kim, and J. Kim, "Composition-dependent trap distributions in CdSe and InP quantum dots probed using photoluminescence blinking dynamics," *Nanoscale*, vol. 8, no. 29, pp. 14109–14116, Jul. 2016, doi: 10.1039/C5NR09291D.

[173] S. Y. Lim, W. Shen, and Z. Gao, "Carbon quantum dots and their applications," *Chem. Soc. Rev.*, vol. 44, no. 1, pp. 362–381, Dec. 2014, doi: 10.1039/C4CS00269E.

[174] X. Hu *et al.*, "Green one-step synthesis of carbon quantum dots from orange peel for fluorescent detection of Escherichia coli in milk," *Food Chem.*, vol. 339, p. 127775, Mar. 2021, doi: 10.1016/J.FOODCHEM.2020.127775.

[175] C. Zhu, J. Zhai, and S. Dong, "Bifunctional fluorescent carbon nanodots: green synthesis via soy milk and application as metal-free electrocatalysts for oxygen reduction," *Chem. Commun.*, vol. 48, no. 75, pp. 9367–9369, Aug. 2012, doi: 10.1039/C2CC33844K.

[176] O. M. Ali, M. S. Hasanin, W. B. Suleiman, E. E. H. Helal, and A. H. Hashem, "Green biosynthesis of titanium dioxide quantum dots using watermelon peel waste: antimicrobial, antioxidant, and anticancer activities," *Biomass Convers. Biorefinery*, vol. 1, pp. 1–12, May 2022, doi: 10.1007/S13399-022-02772-Y/FIGURES/8.

[177] S. Zhao *et al.*, "Green Synthesis of Bifunctional Fluorescent Carbon Dots from Garlic for Cellular Imaging and Free Radical Scavenging," *ACS Appl. Mater. Interfaces*, vol. 7, no. 31, pp. 17054–17060, Aug. 2015, doi: 10.1021/ACSAMI.5B03228/ASSET/IMAGES/LARGE/AM-2015-03228E_0008.JPEG.

[178] Z. Peng *et al.*, "Carbon dots: Biomacromolecule interaction, bioimaging and nanomedicine," *Coord. Chem. Rev.*, vol. 343, pp. 256–277, Jul. 2017, doi: 10.1016/J.CCR.2017.06.001.

[179] H. Li *et al.*, "One-step ultrasonic synthesis of water-soluble carbon nanoparticles with excellent photoluminescent properties," *Carbon N. Y.*, vol. 49, no. 2, pp. 605–609, Feb. 2011, doi: 10.1016/J.CARBON.2010.10.004.

[180] Q. Wang *et al.*, "S,N-Codoped oil-soluble fluorescent carbon dots for a high color-rendering WLED," *J. Mater. Chem. C*, vol. 8, no. 13, pp. 4343–4349, Apr. 2020, doi: 10.1039/D0TC00016G.

[181] P. C. Hsu and H. T. Chang, "Synthesis of high-quality carbon nanodots from hydrophilic compounds: role of functional groups," *Chem. Commun.*, vol. 48, no. 33, pp. 3984–3986, Mar. 2012, doi: 10.1039/C2CC30188A.

[182] M. J. Meziani *et al.*, "Visible-Light-Activated Bactericidal Functions of Carbon 'quantum' Dots," *ACS Appl. Mater. Interfaces*, vol. 8, no. 17, pp. 10761–10766, May 2016, doi: 10.1021/ACSAMI.6B01765/ASSET/IMAGES/LARGE/AM-2016-01765X_0005.JPEG.

[183] I. Milenkovic *et al.*, "Fingerprint imaging using N-doped carbon dots," *Carbon N. Y.*, vol. 144, pp. 791–797, Apr. 2019, doi: 10.1016/J.CARBON.2018.12.102.

[184] R. Pratap, V. Vishal, S. Chaudhary, and A. S. Parmar, "Fabrication of white light emitting diodes via high yield surface passivated carbon quantum dots doped with terbium," *RSC Adv.*, vol. 13, no. 3, pp. 1974–1984, Jan. 2023, doi: 10.1039/D2RA07890B.

[185] "Review on traditional medicinal plant: Plumeria rubra." https://www.plantsjournal.com/archives/?year=2016&vol=4&issue=6&part=C&ArticleId=480 (accessed Dec. 14, 2022).

[186] J. M. S. Lopes, S. G. C. Moreira, and N. M. Barbosa Neto, "Selective Inner-Filter on the Fluorescence Response of Chlorophyll and Pheophytin Molecules Extracted from *Caesalpinia echinata* Leaves," *J. Braz. Chem. Soc.*, vol. 31, no. 1, pp. 162–169, Jan. 2020, doi: 10.21577/0103-5053.20190150.

[187] S. Chandra *et al.*, "High throughput electron transfer from carbon dots to chloroplast: a rationale of enhanced photosynthesis," *Nanoscale*, vol. 6, no. 7, pp. 3647–3655, Mar. 2014, doi: 10.1039/C3NR06079A.

[188] P. Wang *et al.*, "An improved synthesis of water-soluble dual fluorescence emission carbon dots from holly leaves for accurate detection of mercury ions in living cells," *Int. J. Nanomedicine*, vol. 16, pp. 2045–2058, 2021, doi: 10.2147/IJN.S298152.

[189] A. Dager, T. Uchida, T. Maekawa, and M. Tachibana, "Synthesis and characterization of Mono-disperse Carbon Quantum Dots from Fennel Seeds: Photoluminescence analysis using Machine Learning," *Sci. Reports 2019 91*, vol. 9, no. 1, pp. 1–12, Sep. 2019, doi: 10.1038/s41598-019-50397-5.

[190] J. F. K. Alsadooni and S. R. K. Obada, "Green synthesis Quantum Dots (GQD) from Coconut Husk (Cocos nucifera L) the Evaluation for Antibacterial and Cytological Activity," *Int. J. Adv. Sci. Technol.*, pp. 401–409, Sep. 2019, Accessed: Mar. 25, 2023. [Online]. Available: http://sersc.org/journals/index.php/IJAST/article/view/454.

[191] Q. Zhang *et al.*, "The application of green-synthesis-derived carbon quantum dots to bioimaging and the analysis of mercury(II)," *J. Anal. Methods Chem.*, vol. 2019, 2019, doi: 10.1155/2019/8183134.

[192] A. Tadesse, M. Hagos, D. Ramadevi, K. Basavaiah, and N. Belachew, "Fluorescent-Nitrogen-Doped Carbon Quantum Dots Derived from Citrus Lemon Juice: Green Synthesis, Mercury(II) Ion Sensing, and Live Cell Imaging," *ACS Omega*, vol. 5, no. 8, pp. 3889–3898, 2020, doi: 10.1021/acsomega.9b03175.

[193] J. Liu *et al.*, "Selective detection of mercury ions based on tin oxide quantum dots: performance and fluorescence enhancement model," *J. Mater. Chem. C*, vol. 9, no. 26, pp. 8274–8284, 2021, doi: 10.1039/d1tc00824b.

[194] S. Gao, G. Tan, H. Yuan, D. Xiao, and M. M. F. Choi, "A Simple Fluorometric Method Using Chlorophyll a for Determination of Hg2+ Ion," *Microchim. Acta 2006 1533*, vol. 153, no. 3, pp. 159–162, Jan. 2006, doi: 10.1007/S00604-005-0471-Z.

[195] W. Yao, Y. Hua, Z. Yan, C. Wu, F. Zhou, and Y. Liu, "Sulfhydryl functionalized carbon quantum dots as a turn-off fluorescent probe for sensitive detection of Hg2+," *RSC Adv.*, vol. 11, no. 57, pp. 36310–36318, 2021, doi: 10.1039/d1ra06527k.

[196] M. Wang, G. Meng, and Q. Huang, "Spinach-extracted chlorophyll-a modified peanut shell as fluorescence sensors for selective detection of Hg2+ in water," *Sensors Actuators B Chem.*, vol. 209, pp. 237–241, Mar. 2015, doi: 10.1016/J.SNB.2014.11.117.

[197] C. Karami, M. A. Taher, and M. Shahlaei, "A simple method for determination of mercury (II) ions by PNBS-doped carbon dots as a fluorescent probe," *J. Mater. Sci. Mater. Electron.*, vol. 31, no. 8, pp. 5975–5983, 2020, doi: 10.1007/s10854-020-03157-5.

[198] D. Pooja, S. Saini, A. Thakur, B. Kumar, S. Tyagi, and M. K. Nayak, "A 'Turn-On' thiol functionalized fluorescent carbon quantum dot based chemosensory system for arsenite detection," *J. Hazard. Mater.*, vol. 328, pp. 117–126, Apr. 2017, doi: 10.1016/J.JHAZMAT.2017.01.015.

[199] K. Radhakrishnan and P. Panneerselvam, "Green synthesis of surface-passivated carbon dots from the prickly pear cactus as a fluorescent probe for the dual detection of arsenic(iii) and hypochlorite ions from drinking water," *RSC Adv.*, vol. 8, no. 53, pp. 30455–30467, Aug. 2018, doi: 10.1039/C8RA05861J.

[200] G. K. Soni, N. Wangoo, C. Cokca, K. Peneva, and R. K. Sharma, "Analytica Chimica Acta Ultrasensitive aptasensor for arsenic detection using quantum dots and guanylated Poly (methacrylamide)," *Anal. Chim. Acta*, vol. 1209, no. January, p. 339854, 2022, doi: 10.1016/j.aca.2022.339854.

[201] G. Tang, J. Wang, Y. Li, and X. Su, "Determination of arsenic(iii) based on the fluorescence resonance energy transfer between CdTe QDs and Rhodamine 6G," *RSC Adv.*, vol. 5, no. 23, pp. 17519–17525, 2015, doi: 10.1039/c4ra16789a.

[202] N. Butwong, T. Noipa, R. Burakham, S. Srijaranai, and W. Ngeontae, "Determination of arsenic based on quenching of CdS quantum dots fluorescence using the gas-diffusion flow injection method," *Talanta*, vol. 85, no. 2, pp. 1063–1069, 2011, doi: 10.1016/j.talanta.2011.05.023.

[203] T. Shindhal *et al.*, "A critical review on advances in the practices and perspectives for the treatment of dye industry wastewater," *Bioengineered*, vol. 12, no. 1, pp. 70–87, 2021, doi: 10.1080/21655979.2020.1863034/SUPPL_FILE/KBIE_A_1863034_SM9685.ZIP.

[204] S. K. Pal, B. H. Childs, and M. Pegram, "Triple negative breast cancer: unmet medical needs," *Breast Cancer Res. Treat.*, vol. 125, no. 3, pp. 627–636, Feb. 2011, doi: 10.1007/S10549-010-1293-1.

[205] A. Baranova *et al.*, "Triple-negative breast cancer: current treatment strategies and factors of negative prognosis," *J. Med. Life*, vol. 15, no. 2, p. 153, Feb. 2022, doi: 10.25122/JML-2021-0108.

[206] R. G. Snodgrass, A. C. Collier, A. E. Coon, and C. A. Pritsos, "Mitomycin C Inhibits Ribosomal RNA," *J. Biol. Chem.*, vol. 285, no. 25, pp. 19068–19075, Jun. 2010, doi: 10.1074/jbc.m109.040477.

[207] "Benefits of Nanotechnology for Cancer - NCI." https://www.cancer.gov/nano/cancer-nanotechnology/benefits (accessed Sep. 04, 2023).

[208] Y. Yao *et al.*, "Nanoparticle-Based Drug Delivery in Cancer Therapy and Its Role in

Overcoming Drug Resistance," *Front. Mol. Biosci.*, vol. 7, p. 193, Aug. 2020, doi: 10.3389/FMOLB.2020.00193.

[209] X. Li, F. Ma, M. Yang, and J. Zhang, "Nanomaterial based analytical methods for breast cancer biomarker detection," *Mater. Today Adv.*, vol. 14, p. 100219, Jun. 2022, doi: 10.1016/J.MTADV.2022.100219.

[210] M. Jiang, J. Zhou, X. Xie, Z. Huang, R. Liu, and Y. Lv, "Single Nanoparticle Counting-Based Liquid Biopsy for Cancer Diagnosis," *Anal. Chem.*, vol. 94, no. 44, pp. 15433–15439, Nov. 2022, doi: 10.1021/ACS.ANALCHEM.2C03367.

[211] P. H. Wu, A. E. Opadele, Y. Onodera, and J. M. Nam, "Targeting Integrins in Cancer Nanomedicine: Applications in Cancer Diagnosis and Therapy," *Cancers 2019, Vol. 11, Page 1783*, vol. 11, no. 11, p. 1783, Nov. 2019, doi: 10.3390/CANCERS11111783.

[212] S. A. A. Rizvi and A. M. Saleh, "Applications of nanoparticle systems in drug delivery technology," *Saudi Pharm. J. SPJ*, vol. 26, no. 1, p. 64, Jan. 2018, doi: 10.1016/J.JSPS.2017.10.012.

[213] J. O. Adeyemi, A. O. Oriola, D. C. Onwudiwe, and A. O. Oyedeji, "Plant Extracts Mediated Metal-Based Nanoparticles: Synthesis and Biological Applications," *Biomolecules*, vol. 12, no. 5, May 2022, doi: 10.3390/BIOM12050627.

[214] S. Y. Lee, S. Krishnamurthy, C. W. Cho, and Y. S. Yun, "Biosynthesis of Gold Nanoparticles Using Ocimum sanctum Extracts by Solvents with Different Polarity," *ACS Sustain. Chem. Eng.*, vol. 4, no. 5, pp. 2651–2659, May 2016, doi: 10.1021/ACSSUSCHEMENG.6B00161.

[215] M. S. Baliga *et al.*, "Ocimum Sanctum L (Holy Basil or Tulsi) and Its Phytochemicals in the Prevention and Treatment of Cancer," *Nutr. Cancer*, vol. 65, no. SUPPL.1, pp. 26–35, Oct. 2013, doi: 10.1080/01635581.2013.785010.

[216] N. Singh, P. Verma, B. R. Pandey, and M. Bhalla, "THERAPEUTIC POTENTIAL OF OCIMUM SANCTUM IN PREVENTION AND TREATMENT OF CANCER AND EXPOSURE TO RADIATION: AN OVERVIEW," *Int. J. Pharm. Sci. Drug Res.*, vol. 4, no. 2, pp. 97–104, Apr. 2012, Accessed: Oct. 01, 2023. [Online]. Available: https://www.ijpsdr.com/index.php/ijpsdr/article/view/193.

[217] B. Sung, H. Y. Chung, and N. D. Kim, "Role of Apigenin in Cancer Prevention via the Induction of Apoptosis and Autophagy," *J. Cancer Prev.*, vol. 21, no. 4, p. 216, Dec. 2016, doi: 10.15430/JCP.2016.21.4.216.

[218] M. Moudi, R. Go, C. Y. S. Yien, and M. Nazre, "Vinca Alkaloids," *Int. J. Prev. Med.*, vol. 4, no. 11, p. 1231, Nov. 2013, doi: 10.2165/00128415-200711380-00080.

[219] P. Dhyani *et al.*, "Anticancer potential of alkaloids: a key emphasis to colchicine, vinblastine, vincristine, vindesine, vinorelbine and vincamine," *Cancer Cell Int. 2022 221*, vol. 22, no. 1, pp. 1–20, Jun. 2022, doi: 10.1186/S12935-022-02624-9.

[220] N. Jamshidi and M. M. Cohen, "The Clinical Efficacy and Safety of Tulsi in Humans: A Systematic Review of the Literature," *Evid. Based. Complement. Alternat. Med.*, vol. 2017, 2017, doi: 10.1155/2017/9217567.

[221] M. M. Cohen, "Tulsi - Ocimum sanctum: A herb for all reasons," *J. Ayurveda Integr. Med.*, vol. 5, no. 4, p. 251, Oct. 2014, doi: 10.4103/0975-9476.146554.

[222] B. Salehi *et al.*, "Antidiabetic Potential of Medicinal Plants and Their Active Components," *Biomolecules*, vol. 9, no. 10, Oct. 2019, doi: 10.3390/BIOM9100551.

[223] B. K. Bindhani and A. K. Panigrahi, "Biosynthesis and Characterization of Silver Nanoparticles (Snps) by using Leaf Extracts of Ocimum Sanctum L (Tulsi) and Study of its Antibacterial Activities," *J. Nanomed. Nanotechnol.*, vol. s6, 2015, doi: 10.4172/2157-7439.S6-008.

[224] D. Raghunandan, S. Basavaraja, B. Mahesh, S. Balaji, S. Y. Manjunath, and A. Venkataraman, "Biosynthesis of stable polyshaped gold nanoparticles from microwave-exposed aqueous extracellular anti-malignant guava (psidium guajava) leaf extract," *Nanobiotechnology*, vol. 5, no. 1–4, pp. 34–41, Dec. 2009, doi: 10.1007/S12030-009-9030-8/METRICS.

[225] J. A. Ascencio, M. Pérez, and M. José-Yacamán, "Truncated icosahedral structure observed in gold nanoparticles," *Surf. Sci.*, vol. 447, no. 1, pp. 73–80, Feb. 2000, doi: 10.1016/S0039-6028(99)01112-7.

[226] R. Chen, J. Wu, H. Li, G. Cheng, Z. Lu, and C. M. Che, "Fabrication of gold nanoparticles with different morphologies in HEPES buffer," *Rare Met.*, vol. 29, no. 2, pp. 180–186, Apr. 2010, doi: 10.1007/S12598-010-0031-5/METRICS.

[227] M. Tsuji *et al.*, "Shape and size controlled synthesis of gold nanocrystals using oxidative etching by AuCl4- and Cl- anions in microwave-polyol process," *Colloids Surfaces A Physicochem. Eng. Asp.*, vol. 302, no. 1–3, pp. 587–598, Jul. 2007, doi: 10.1016/J.COLSURFA.2007.03.044.

[228] C. A. Foss, G. L. Hornyak, J. A. Stockert, and C. R. Martin, "Template-synthesized nanoscopic gold particles: Optical spectra and the effects of particle size and shape," *J. Phys. Chem.*, vol. 98, no. 11, pp. 2963–2971, 1994, doi: 10.1021/J100062A037/ASSET/J100062A037.FP.PNG_V03.

[229] M. Turki, C. Daniel, S. Zálĭs, J. Vlček, J. Van Slageren, and D. J. Stufkens, "UV - Visible absorption spectra of [Ru(E)(E′)(CO)2(iPr-DAB)] (E = E′ = SnPh3 or Cl; E = SnPh3 or Cl, E′ = CH3; iPr-DAB = N, N′-di-isopropyl-1,4-diaza-1,3-butadiene): Combination of

CASSCF/CASPT2 and TD-DFT calculations," *J. Am. Chem. Soc.*, vol. 123, no. 46, pp. 11431–11440, 2001, doi: 10.1021/ja010782b.

[230] J. L. Hammond, N. Bhalla, S. D. Rafiee, and P. Estrela, "Localized Surface Plasmon Resonance as a Biosensing Platform for Developing Countries," *Biosensors*, vol. 4, no. 2, p. 172, 2014, doi: 10.3390/BIOS4020172.

[231] S. Krishnamurthy, A. Esterle, N. C. Sharma, and S. V. Sahi, "Yucca-derived synthesis of gold nanomaterial and their catalytic potential," *Nanoscale Res. Lett.*, vol. 9, no. 1, 2014, doi: 10.1186/1556-276X-9-627.

[232] "ASTM-D4187 | Methods of Test for Zeta Potential of Colloids in Water and Waste Water (Withdrawn 1990) | Document Center, Inc." https://www.document-center.com/standards/show/ASTM-D4187 (accessed May 01, 2023).

[233] B. Salopek, D. Krasic, and S. Filipovic, "Measurement and application of zeta-potential," *Rud. Zb.*, vol. 4, pp. 147–151, 1992.

[234] D. V. Ratnam, D. D. Ankola, V. Bhardwaj, D. K. Sahana, and M. N. V. R. Kumar, "Role of antioxidants in prophylaxis and therapy: A pharmaceutical perspective," *J. Control. Release*, vol. 113, no. 3, pp. 189–207, Jul. 2006, doi: 10.1016/J.JCONREL.2006.04.015).

[235] Y. Ke *et al.*, "Photosynthesized gold nanoparticles from Catharanthus roseus induces caspase-mediated apoptosis in cervical cancer cells (HeLa)," *Artif. cells, nanomedicine, Biotechnol.*, vol. 47, no. 1, pp. 1938–1946, Dec. 2019, doi: 10.1080/21691401.2019.1614017.

[236] B. Perillo *et al.*, "ROS in cancer therapy: the bright side of the moon," *Exp. Mol. Med. 2020 522*, vol. 52, no. 2, pp. 192–203, Feb. 2020, doi: 10.1038/s12276-020-0384-2.

[237] K. Sneha, M. Sathishkumar, S. Kim, and Y. S. Yun, "Counter ions and temperature incorporated tailoring of biogenic gold nanoparticles," *Process Biochem.*, vol. 45, no. 9, pp. 1450–1458, Sep. 2010, doi: 10.1016/J.PROCBIO.2010.05.019.

[238] N. M. Noah and P. M. Ndangili, "Green synthesis of nanomaterials from sustainable materials for biosensors and drug delivery," *Sensors Int.*, vol. 3, p. 100166, Jan. 2022, doi: 10.1016/J.SINTL.2022.100166.

[239] A. Bhaumik *et al.*, "Reduced Graphene Oxide Thin Films with Very Large Charge Carrier Mobility Using Pulsed Laser Deposition," *J. Mater. Sci. Eng.*, vol. 06, no. 04, 2017, doi: 10.4172/2169-0022.1000364.

[240] M. Smith, L. Scudiero, J. Espinal, J. S. McEwen, and M. Garcia-Perez, "Improving the deconvolution and interpretation of XPS spectra from chars by ab initio calculations," *Carbon N. Y.*, vol. 110, pp. 155–171, Dec. 2016, doi: 10.1016/J.CARBON.2016.09.012.

[241] G. Dodero *et al.*, "l-Cysteine chemisorption on gold: an XPS and STM study," *Colloids Surfaces A Physicochem. Eng. Asp.*, vol. 175, no. 1–2, pp. 121–128, Dec. 2000, doi: 10.1016/S0927-7757(00)00521-5.

[242] J. Jin, G. D. Kong, and H. J. Yoon, "Deconvolution of Tunneling Current in Large-Area Junctions Formed with Mixed Self-Assembled Monolayers," *J. Phys. Chem. Lett.*, vol. 9, no. 16, pp. 4578–4583, Aug. 2018, doi: 10.1021/ACS.JPCLETT.8B01997/ASSET/IMAGES/LARGE/JZ-2018-019976_0006.JPEG.

[243] D. Mohapatra *et al.*, *Tinospora cordifolia Leaves Derived Carbon dots for Cancer Cell Bioimaging, Free radical Scavenging, and Fe3+ Sensing Applications*, vol. 32, no. 1. 2022.

[244] N. Sharma, G. S. Das, and K. Yun, "Green synthesis of multipurpose carbon quantum dots from red cabbage and estimation of their antioxidant potential and bio-labeling activity," *Appl. Microbiol. Biotechnol.*, vol. 104, no. 16, pp. 7187–7200, Aug. 2020, doi: 10.1007/S00253-020-10726-5/FIGURES/9.

[245] P. K. Gautam *et al.*, "Biologically Synthesized Gold Nanoparticles using Ocimum sanctum (Tulsi Leaf Extract) Induced Anti-Tumor Response in a T Cell Daltons Lymphoma," *J. Cell Sci. Ther.*, vol. 8, no. 6, pp. 1–9, 2017, doi: 10.4172/2157-7013.1000278.

[246] A. K. Verma, A. Chanchal, R. P. Pandey, R. Vohra, N. Islam, and A. K. Misra, "Pharmacokinetics and Biodistribution of Paclitaxel–Gelatin Nanoparticles," *Int. J. Green Nanotechnol.*, vol. 4, no. 4, pp. 500–510, 2012, doi: 10.1080/19430892.2012.738962.

[247] C. Wang *et al.*, "Rapid green synthesis of silver and gold nanoparticles using Dendropanax morbifera leaf extract and their anticancer activities," *Int. J. Nanomedicine*, vol. 11, p. 3691, Aug. 2016, doi: 10.2147/IJN.S97181.

[248] N. Gupta, P. Gupta, and S. K. Srivastava, "Penfluridol overcomes paclitaxel resistance in metastatic breast cancer," *Sci. Reports 2019 91*, vol. 9, no. 1, pp. 1–14, Mar. 2019, doi: 10.1038/s41598-019-41632-0.

[249] M. P. Patil and G. Do Kim, "Eco-friendly approach for nanoparticles synthesis and mechanism behind antibacterial activity of silver and anticancer activity of gold nanoparticles," *Appl. Microbiol. Biotechnol.*, vol. 101, no. 1, pp. 79–92, Jan. 2017, doi: 10.1007/S00253-016-8012-8.

[250] M. R. Hasan, B. S. Alotaibi, Z. M. Althafar, A. H. Mujamammi, and J. Jameela, "An Update on the Therapeutic Anticancer Potential of Ocimum sanctum L.: 'Elixir of Life,'" *Molecules*, vol. 28, no. 3, p. 1193, Feb. 2023, doi: 10.3390/MOLECULES28031193.

[251] H. Pischon *et al.*, "Stratum corneum targeting by dendritic core-multishell-nanocarriers in a mouse model of psoriasis," *Nanomedicine*, vol. 13, no. 1, pp. 317–327, Jan. 2017, doi:

10.1016/J.NANO.2016.09.004.

[252] G. Pizzino *et al.*, "Oxidative Stress: Harms and Benefits for Human Health," *Oxid. Med. Cell. Longev.*, vol. 2017, 2017, doi: 10.1155/2017/8416763.

[253] J. K. Birnbaum, C. Duggan, B. O. Anderson, and R. Etzioni, "Early detection and treatment strategies for breast cancer in low-income and upper middle-income countries: a modelling study," *Lancet. Glob. Heal.*, vol. 6, no. 8, p. e885, Aug. 2018, doi: 10.1016/S2214-109X(18)30257-2.

[254] K. E. Ibrahim, M. G. Al-Mutary, A. O. Bakhiet, and H. A. Khan, "Histopathology of the Liver, Kidney, and Spleen of Mice Exposed to Gold Nanoparticles," *Molecules*, vol. 23, no. 8, 2018, doi: 10.3390/MOLECULES23081848.

[255] E. Piktel *et al.*, "ROS-Mediated Apoptosis and Autophagy in Ovarian Cancer Cells Treated with Peanut-Shaped Gold Nanoparticles," *Int. J. Nanomedicine*, vol. 16, p. 1993, 2021, doi: 10.2147/IJN.S277014.

[256] I. Ullah *et al.*, "Green-Synthesized Silver Nanoparticles Induced Apoptotic Cell Death in MCF-7 Breast Cancer Cells by Generating Reactive Oxygen Species and Activating Caspase 3 and 9 Enzyme Activities," *Oxid. Med. Cell. Longev.*, vol. 2020, 2020, doi: 10.1155/2020/1215395.

[257] S. W. Sanderson and K. L. Simons, "Light emitting diodes and the lighting revolution: The emergence of a solid-state lighting industry," *Res. Policy*, vol. 43, no. 10, pp. 1730–1746, Dec. 2014, doi: 10.1016/J.RESPOL.2014.07.011.

[258] S. Bauer, "Blue-Light Hazard of Light-Emitting Diodes Assessed with Gaussian Functions," *Int. J. Environ. Res. Public Health*, vol. 18, no. 2, pp. 1–18, Jan. 2021, doi: 10.3390/IJERPH18020680.

[259] C. Sun *et al.*, "Efficient and Stable White LEDs with Silica-Coated Inorganic Perovskite Quantum Dots," *Adv. Mater.*, vol. 28, no. 45, pp. 10088–10094, Dec. 2016, doi: 10.1002/ADMA.201603081.

[260] W. Ye *et al.*, "High Quantum Yield Gd4.67Si3O13:Eu3+Red-Emitting Phosphor for Tunable White Light-Emitting Devices Driven by UV or Blue LED," *ACS Appl. Electron. Mater.*, vol. 3, no. 3, pp. 1403–1412, Mar. 2021, doi: 10.1021/ACSAELM.1C00012/SUPPL_FILE/EL1C00012_SI_001.PDF.

[261] J. Li *et al.*, "Advanced red phosphors for white light-emitting diodes," *J. Mater. Chem. C*, vol. 4, no. 37, pp. 8611–8623, Sep. 2016, doi: 10.1039/C6TC02695H.

[262] H. S. Jang, Y. H. Won, and D. Y. Jeon, "Improvement of electroluminescent property of blue LED coated with highly luminescent yellow-emitting phosphors," *Appl. Phys. B 2009 954*, vol.

95, no. 4, pp. 715–720, Apr. 2009, doi: 10.1007/S00340-009-3484-1.

[263] J. Chen, Y. Liu, L. Mei, P. Peng, Q. Cheng, and H. Liu, "Design of a Yellow-Emitting Phosphor with Enhanced Red Emission via Valence State-control for Warm White LEDs Application," *Sci. Reports 2016 61*, vol. 6, no. 1, pp. 1–11, Aug. 2016, doi: 10.1038/srep31199.

[264] M. J. Bowers, J. R. McBride, and S. J. Rosenthal, "White-light emission from magic-sized cadmium selenide nanocrystals," *J. Am. Chem. Soc.*, vol. 127, no. 44, pp. 15378–15379, Nov. 2005, doi: 10.1021/JA055470D/SUPPL_FILE/JA055470DSI20051004_020032.PDF.

[265] A. O. Orlova *et al.*, "Formation of structures based on semiconductor quantum dots and organic molecules in track pore membranes," *J. Appl. Phys.*, vol. 113, no. 21, p. 214305, Jun. 2013, doi: 10.1063/1.4809645.

[266] S. Sapra, S. Mayilo, T. A. Klar, A. L. Rogach, and J. Feldmann, "Bright White-Light Emission from Semiconductor Nanocrystals: by Chance and by Design," *Adv. Mater.*, vol. 19, no. 4, pp. 569–572, Feb. 2007, doi: 10.1002/ADMA.200602267.

[267] C. X. Li, C. Yu, C. F. Wang, and S. Chen, "Facile plasma-induced fabrication of fluorescent carbon dots toward high-performance white LEDs," *J. Mater. Sci.*, vol. 48, no. 18, pp. 6307–6311, Sep. 2013, doi: 10.1007/S10853-013-7430-6.

[268] C. Sun *et al.*, "Combination of carbon dot and polymer dot phosphors for white light-emitting diodes," *Nanoscale*, vol. 7, no. 28, pp. 12045–12050, Jul. 2015, doi: 10.1039/C5NR03014E.

[269] J. Silver and R. Withnall, "Color Conversion Phosphors for LEDS," *Lumin. Mater. Appl.*, pp. 75–109, Mar. 2008, doi: 10.1002/9780470985687.CH3.

[270] Z. Zhang, X. Ma, M. Jia, B. Li, J. Rong, and X. Yang, "Deposition of CdTe quantum dots on microfluidic paper chips for rapid fluorescence detection of pesticide 2,4-D," *Analyst*, vol. 144, no. 4, pp. 1282–1291, Feb. 2019, doi: 10.1039/C8AN02051E.

[271] A. M. Alam, B. Y. Park, Z. K. Ghouri, M. Park, and H. Y. Kim, "Synthesis of carbon quantum dots from cabbage with down- and up-conversion photoluminescence properties: excellent imaging agent for biomedical applications," *Green Chem.*, vol. 17, no. 7, pp. 3791–3797, Jul. 2015, doi: 10.1039/C5GC00686D.

[272] X. Xu *et al.*, "Electrophoretic analysis and purification of fluorescent single-walled carbon nanotube fragments," *J. Am. Chem. Soc.*, vol. 126, no. 40, pp. 12736–12737, Oct. 2004, doi: 10.1021/JA040082H/SUPPL_FILE/JA040082H_S.PDF.

[273] J. Chen, H. Che, K. Huang, C. Liu, and W. Shi, "Fabrication of a ternary plasmonic photocatalyst CQDs/Ag/Ag2O to harness charge flow for photocatalytic elimination of pollutants," *Appl. Catal. B Environ.*, vol. 192, pp. 134–144, Sep. 2016, doi: 10.1016/J.APCATB.2016.03.056.

[274] A. Kim, J. K. Dash, P. Kumar, and R. Patel, "Carbon-Based Quantum Dots for Photovoltaic Devices: A Review," *ACS Appl. Electron. Mater.*, vol. 4, no. 1, pp. 27–58, Jan. 2022, doi: 10.1021/ACSAELM.1C00783/ASSET/IMAGES/MEDIUM/EL1C00783_0027.GIF.

[275] M. Li, T. Chen, J. J. Gooding, and J. Liu, "Review of carbon and graphene quantum dots for sensing," *ACS Sensors*, vol. 4, no. 7, pp. 1732–1748, Jul. 2019, doi: 10.1021/ACSSENSORS.9B00514/SUPPL_FILE/SE9B00514_SI_001.PDF.

[276] K. Naik, S. Chaudhary, L. Ye, and A. S. Parmar, "A Strategic Review on Carbon Quantum Dots for Cancer-Diagnostics and Treatment," *Front. Bioeng. Biotechnol.*, vol. 10, p. 882100, May 2022, doi: 10.3389/FBIOE.2022.882100.

[277] D. V. Talapin and J. Steckel, "Quantum dot light-emitting devices," *MRS Bull.*, vol. 38, no. 9, pp. 685–691, Sep. 2013, doi: 10.1557/MRS.2013.204/FIGURES/5.

[278] L. Bao *et al.*, "Electrochemical Tuning of Luminescent Carbon Nanodots: From Preparation to Luminescence Mechanism," *Adv. Mater.*, vol. 23, no. 48, pp. 5801–5806, Dec. 2011, doi: 10.1002/ADMA.201102866.

[279] Y. Zhao, S. Zuo, and M. Miao, "The effect of oxygen on the microwave-assisted synthesis of carbon quantum dots from polyethylene glycol," *RSC Adv.*, vol. 7, no. 27, pp. 16637–16643, Mar. 2017, doi: 10.1039/C7RA01804E.

[280] L. Cui, X. Ren, J. Wang, and M. Sun, "Synthesis of homogeneous carbon quantum dots by ultrafast dual-beam pulsed laser ablation for bioimaging," *Mater. Today Nano*, vol. 12, p. 100091, Dec. 2020, doi: 10.1016/J.MTNANO.2020.100091.

[281] V. A. Öberg, X. Zhang, M. B. Johansson, and E. M. J. Johansson, "Hot-Injection Synthesized Ag2S Quantum Dots with Broad Light Absorption and High Stability for Solar Cell Applications," *ChemNanoMat*, vol. 4, no. 12, pp. 1223–1230, Dec. 2018, doi: 10.1002/CNMA.201800263.

[282] L. Lin, M. Rong, F. Luo, D. Chen, Y. Wang, and X. Chen, "Review," *Trends Anal. Chem.*, vol. Complete, no. 54, pp. 83–102, 2014, doi: 10.1016/J.TRAC.2013.11.001.

[283] J. Wang *et al.*, "A terbium metal–organic framework with stable luminescent emission in a wide pH range that acts as a quantitative detection material for nitroaromatics," *RSC Adv.*, vol. 5, no. 60, pp. 48574–48579, Jun. 2015, doi: 10.1039/C5RA06308F.

[284] S. Qu *et al.*, "A Biocompatible Fluorescent Ink Based on Water-Soluble Luminescent Carbon Nanodots," *Angew. Chemie Int. Ed.*, vol. 51, no. 49, pp. 12215–12218, Dec. 2012, doi: 10.1002/ANIE.201206791.

[285] L. Tang *et al.*, "Deep ultraviolet photoluminescence of water-soluble self-passivated graphene

quantum dots," *ACS Nano*, vol. 6, no. 6, pp. 5102–5110, Jun. 2012, doi: 10.1021/NN300760G.

[286] D. Qu *et al.*, "Highly luminescent S, N co-doped graphene quantum dots with broad visible absorption bands for visible light photocatalysts," *Nanoscale*, vol. 5, no. 24, pp. 12272–12277, Nov. 2013, doi: 10.1039/C3NR04402E.

[287] R. Remelli, C. Varotto, D. Sandonà, R. Croce, and R. Bassi, "Chlorophyll binding to monomeric light-harvesting complex. A mutation analysis of chromophore-binding residues," *J. Biol. Chem.*, vol. 274, no. 47, pp. 33510–33521, Nov. 1999, doi: 10.1074/JBC.274.47.33510.

[288] J. M. S. Lopes, S. G. C. Moreira, and N. M. Barbosa Neto, "Selective Inner-Filter on the Fluorescence Response of Chlorophyll and Pheophytin Molecules Extracted from *Caesalpinia echinata* Leaves," *J. Braz. Chem. Soc.*, vol. 31, no. 1, pp. 162–169, Jan. 2020, doi: 10.21577/0103-5053.20190150.

[289] L. A. A. Chunduri, A. Kurdekar, S. Patnaik, B. V. Dev, T. M. Rattan, and V. Kamisetti, "Carbon Quantum Dots from Coconut Husk: Evaluation for Antioxidant and Cytotoxic Activity," *Mater. Focus*, vol. 5, no. 1, pp. 55–61, Feb. 2016, doi: 10.1166/MAT.2016.1289.

[290] M. M. J. Treacy and J. B. Higgins, "Collection of Simulated XRD Powder Patterns for Zeolites Editors," Accessed: Aug. 29, 2022. [Online]. Available: http://www.iza-structure.org/databases/.

[291] "IR Spectrum Table." https://www.sigmaaldrich.com/IN/en/technical-documents/technical-article/analytical-chemistry/photometry-and-reflectometry/ir-spectrum-table (accessed Aug. 29, 2022).

[292] H. Li *et al.*, "Enhancement of photocatalytic activity in Tb/Eu co-doped Bi2MoO6: the synergistic effect of Tb–Eu redox cycles," *RSC Adv.*, vol. 6, no. 53, pp. 48089–48098, May 2016, doi: 10.1039/C6RA08739F.

[293] Y. Zhao, J. G. Li, M. Guo, and X. Yang, "Structural and photoluminescent investigation of LTbH/LEuH nanosheets and their color-tunable colloidal hybrids," *J. Mater. Chem. C*, vol. 1, no. 22, pp. 3584–3592, May 2013, doi: 10.1039/C3TC30205A.

[294] B. Cui *et al.*, "The use of carbon quantum dots as fluorescent materials in white LEDs," *Xinxing Tan Cailiao/New Carbon Mater.*, vol. 32, no. 5, pp. 385–401, Oct. 2017, doi: 10.1016/S1872-5805(17)60130-6.

[295] Y. Zhang *et al.*, "Water-soluble, nitrogen-doped fluorescent carbon dots for highly sensitive and selective detection of Hg2+ in aqueous solution," *RSC Adv.*, vol. 5, no. 50, pp. 40393–40401, Apr. 2015, doi: 10.1039/C5RA04653J.

[296] Y. P. Sun *et al.*, "Quantum-sized carbon dots for bright and colorful photoluminescence," *J. Am.*

Chem. Soc., vol. 128, no. 24, pp. 7756–7757, Jun. 2006, doi: 10.1021/JA062677D/SUPPL_FILE/JA062677DSI20060417_112943.PDF.

[297] Y. Dong *et al.*, "Blue luminescent graphene quantum dots and graphene oxide prepared by tuning the carbonization degree of citric acid," *Carbon N. Y.*, vol. 50, no. 12, pp. 4738–4743, Oct. 2012, doi: 10.1016/J.CARBON.2012.06.002.

[298] Y. Dong *et al.*, "Carbon-Based Dots Co-doped with Nitrogen and Sulfur for High Quantum Yield and Excitation-Independent Emission," *Angew. Chemie Int. Ed.*, vol. 52, no. 30, pp. 7800–7804, Jul. 2013, doi: 10.1002/ANIE.201301114.

[299] S. Zhu, Y. Song, X. Zhao, J. Shao, J. Zhang, and B. Yang, "The photoluminescence mechanism in carbon dots (graphene quantum dots, carbon nanodots, and polymer dots): current state and future perspective," *Nano Res. 2014 82*, vol. 8, no. 2, pp. 355–381, Feb. 2015, doi: 10.1007/S12274-014-0644-3.

[300] C. Liu, P. Zhang, F. Tian, W. Li, F. Li, and W. Liu, "One-step synthesis of surface passivated carbon nanodots by microwave assisted pyrolysis for enhanced multicolor photoluminescence and bioimaging," *J. Mater. Chem.*, vol. 21, no. 35, pp. 13163–13167, Aug. 2011, doi: 10.1039/C1JM12744F.

[301] C. W. Lai, Y. H. Hsiao, Y. K. Peng, and P. T. Chou, "Facile synthesis of highly emissive carbon dots from pyrolysis of glycerol; gram scale production of carbon dots/mSiO2 for cell imaging and drug release," *J. Mater. Chem.*, vol. 22, no. 29, pp. 14403–14409, Jul. 2012, doi: 10.1039/C2JM32206D.

[302] W. Kwon *et al.*, "Electroluminescence from graphene quantum dots prepared by amidative cutting of tattered graphite," *Nano Lett.*, vol. 14, no. 3, pp. 1306–1311, Mar. 2014, doi: 10.1021/NL404281H.

[303] V. Nguyen, J. Si, L. Yan, and X. Hou, "Electron–hole recombination dynamics in carbon nanodots," *Carbon N. Y.*, vol. 95, pp. 659–663, Dec. 2015, doi: 10.1016/J.CARBON.2015.08.066.

[304] P. G. Wu and L. Brand, "Resonance energy transfer: Methods and applications," *Anal. Biochem.*, vol. 218, no. 1, pp. 1–13, 1994, doi: 10.1006/abio.1994.1134.

[305] R. M. Clegg, "Chapter 1 Förster resonance energy transfer-FRET what is it, why do it, and how it's done," *Lab. Tech. Biochem. Mol. Biol.*, vol. 33, no. C, pp. 1–57, 2009, doi: 10.1016/S0075-7535(08)00001-6.

[306] Q. Tang, J. Shen, W. Zhou, W. Zhang, W. Yu, and Y. Qian, "Preparation, characterization and optical properties of terbium oxide nanotubes," *J. Mater. Chem.*, vol. 13, no. 12, pp. 3103–3106,

Nov. 2003, doi: 10.1039/B308713A.

[307] H. J. Lozykowski, W. M. Jadwisienczak, and I. Brown, "Visible cathodoluminescence of GaN doped with Dy, Er, and Tm," *Appl. Phys. Lett.*, vol. 74, no. 8, p. 1129, Feb. 1999, doi: 10.1063/1.123465.

[308] Q. L. Liu, F. X. Zhang, T. Tanaka, and T. Aizawa, "Green emission from B2N2CO thin films doped with Tb," *Appl. Phys. Lett.*, vol. 81, no. 1, p. 34, Jun. 2002, doi: 10.1063/1.1490143.

[309] C. Jia *et al.*, "Photoluminescence and energy transfer of terbium doped titania film," *Thin Solid Films*, vol. 2, no. 496, pp. 555–559, Feb. 2006, doi: 10.1016/J.TSF.2005.08.378.

[310] M. C. Gather, A. Köhnen, and K. Meerholz, "White Organic Light-Emitting Diodes," *Adv. Mater.*, vol. 23, no. 2, pp. 233–248, Jan. 2011, doi: 10.1002/ADMA.201002636.

[311] P. Balasubramanian, T. S. T. Balamurugan, S. M. Chen, and T. W. Chen, "Simplistic synthesis of ultrafine CoMnO3 nanosheets: An excellent electrocatalyst for highly sensitive detection of toxic 4-nitrophenol in environmental water samples," *J. Hazard. Mater.*, vol. 361, pp. 123–133, Jan. 2019, doi: 10.1016/J.JHAZMAT.2018.08.070.

[312] P. G. Rieger, H. M. Meier, M. Gerle, U. Vogt, T. Groth, and H. J. Knackmuss, "Xenobiotics in the environment: Present and future strategies to obviate the problem of biological persistence," *J. Biotechnol.*, vol. 94, no. 1, pp. 101–123, Mar. 2002, doi: 10.1016/S0168-1656(01)00422-9.

[313] G. J. Zylstra, S. W. Bang, L. M. Newman, and L. L. Perry, "Microbial degradation of mononitrophenols and mononitrobenzoates." CRC Press, pp. 145–160, Jan. 01, 2000, Accessed: Mar. 12, 2023. [Online]. Available: https://www.researchwithrutgers.com/en/publications/microbial-degradation-of-mononitrophenols-and-mononitrobenzoates.

[314] M. R. H. Podeh, S. K. Bhattacharya, and M. Qu, "Effects of nitrophenols on acetate utilizing methanogenic systems," *Water Res.*, vol. 29, no. 2, pp. 391–399, Feb. 1995, doi: 10.1016/0043-1354(94)00193-B.

[315] B. Schink, "Energetics of syntrophic cooperation in methanogenic degradation.," *Microbiol. Mol. Biol. Rev.*, vol. 61, no. 2, p. 262, Jun. 1997, doi: 10.1128/MMBR.61.2.262-280.1997.

[316] "Toxic and Priority Pollutants Under the Clean Water Act | US EPA." https://www.epa.gov/eg/toxic-and-priority-pollutants-under-clean-water-act (accessed Mar. 12, 2023).

[317] T. Substances and D. Registry, "Toxicological Profile for Nitrophenols Draft for Public Comment Toxicological Profile for Toxicological Toxicological Profile Profile for for Nitrophenols Nitrophenols Nitrophenols," 2022.

[318] A. Das and A. Dey, "P-Nitrophenol -Bioremediation using potent Pseudomonas strain from the textile dye industry effluent," *J. Environ. Chem. Eng.*, vol. 8, no. 4, p. 103830, Aug. 2020, doi: 10.1016/J.JECE.2020.103830.

[319] Y. Zhao, L. Wang, L. Zhu, F. Gao, X. Xu, and J. Yang, "Removal of p-Nitrophenol from simulated sewage using steel slag: Capability and mechanism," *Environ. Res.*, vol. 212, p. 113450, Sep. 2022, doi: 10.1016/J.ENVRES.2022.113450.

[320] Environmental Protection Agency, "Risk Assessment of Spent Foundry Sands In Soil-Related Applications Evaluating Silica-based Spent Foundry Sand From Iron, Steel, and Aluminum Foundries," no. October, p. 477, 2014.

[321] Z. Wu *et al.*, "Enhanced adsorptive removal of p-nitrophenol from water by aluminum metal–organic framework/reduced graphene oxide composite," *Sci. Reports 2016 61*, vol. 6, no. 1, pp. 1–13, May 2016, doi: 10.1038/srep25638.

[322] M. Patel, R. Kumar, K. Kishor, T. Mlsna, C. U. Pittman, and D. Mohan, "Pharmaceuticals of emerging concern in aquatic systems: Chemistry, occurrence, effects, and removal methods," *Chem. Rev.*, vol. 119, no. 6, pp. 3510–3673, 2019, doi: 10.1021/acs.chemrev.8b00299.

[323] M. T. Amin, A. A. Alazba, and U. Manzoor, "A review of removal of pollutants from water/wastewater using different types of nanomaterials," *Adv. Mater. Sci. Eng.*, vol. 2014, 2014, doi: 10.1155/2014/825910.

[324] J. Xu *et al.*, "Biodegradation of p-nitrophenol by engineered strain," *AMB Express*, vol. 11, no. 1, pp. 1–8, Dec. 2021, doi: 10.1186/S13568-021-01284-8/FIGURES/5.

[325] Y. Zheng *et al.*, "Biodegradation of p-nitrophenol by Pseudomonas aeruginosa HS-D38 and analysis of metabolites with HPLC-ESI/MS," *Int. Biodeterior. Biodegrad.*, vol. 63, no. 8, pp. 1125–1129, Dec. 2009, doi: 10.1016/J.IBIOD.2009.09.010.

[326] P. Mulchandani, C. M. Hangarter, Y. Lei, W. Chen, and A. Mulchandani, "Amperometric microbial biosensor for p-nitrophenol using Moraxella sp.-modified carbon paste electrode," *Biosens. Bioelectron.*, vol. 21, no. 3, pp. 523–527, Sep. 2005, doi: 10.1016/J.BIOS.2004.11.011.

[327] N. Ahmad, A. S. Al-Fatesh, R. Wahab, M. Alam, and A. H. Fakeeha, "Synthesis of silver nanoparticles decorated on reduced graphene oxide nanosheets and their electrochemical sensing towards hazardous 4-nitrophenol," *J. Mater. Sci. Mater. Electron. 2020 3114*, vol. 31, no. 14, pp. 11927–11937, Jun. 2020, doi: 10.1007/S10854-020-03747-3.

[328] X. Li, C. Li, A. K. Suzuki, S. Taneda, G. Watanabe, and K. Taya, "4-Nitrophenol isolated from diesel exhaust particles disrupts regulation of reproductive hormones in immature male rats," *Endocrine*, vol. 36, no. 1, pp. 98–102, 2009, doi: 10.1007/S12020-009-9192-0.

[329] Y. Zhang, Y. Piao, Y. Li, M. Song, P. Tang, and C. M. Li, "4-Nitrophenol induces Leydig cells hyperplasia, which may contribute to the differential modulation of the androgen receptor and estrogen receptor-α and -β expression in male rat testes," *Toxicol. Lett.*, vol. 223, no. 2, pp. 228–235, Nov. 2013, doi: 10.1016/J.TOXLET.2013.09.011.

[330] H. M. Pinheiro, E. Touraud, and O. Thomas, "Aromatic amines from azo dye reduction: status review with emphasis on direct UV spectrophotometric detection in textile industry wastewaters," *Dye. Pigment.*, vol. 61, no. 2, pp. 121–139, May 2004, doi: 10.1016/J.DYEPIG.2003.10.009.

[331] V. Purohit and A. K. Basu, "Mutagenicity of nitroaromatic compounds," *Chem. Res. Toxicol.*, vol. 13, no. 8, pp. 673–692, 2000, doi: 10.1021/TX000002X.

[332] R. K. Jain, J. H. Dreisbach, and J. C. Spain, "Biodegradation of p-nitrophenol via 1,2,4-benzenetriol by an Arthrobacter sp," *Appl. Environ. Microbiol.*, vol. 60, no. 8, pp. 3030–3032, 1994, doi: 10.1128/AEM.60.8.3030-3032.1994.

[333] Z. Liu, C. Yang, and C. Qiao, "Biodegradation of p-nitrophenol and 4-chlorophenol by Stenotrophomonas sp.," *FEMS Microbiol. Lett.*, vol. 277, no. 2, pp. 150–156, Dec. 2007, doi: 10.1111/J.1574-6968.2007.00940.X.

[334] M. Megharaj, H. W. Pearson, and K. Venkateswarlu, "Toxicity of p-aminophenol and p-nitrophenol to Chlorella vulgaris and two species of Nostoc isolated from soil," *Pestic. Biochem. Physiol.*, vol. 40, no. 3, pp. 266–273, Jul. 1991, doi: 10.1016/0048-3575(91)90098-7.

[335] N. Xiao *et al.*, "Highly selective detection of p-nitrophenol using fluorescence assay based on boron, nitrogen co-doped carbon dots," *Talanta*, vol. 184, pp. 184–192, Jul. 2018, doi: 10.1016/J.TALANTA.2018.02.114.

[336] L. Li *et al.*, "Selective and Colorimetric Detection of p-Nitrophenol Based on Inverse Opal Polymeric Photonic Crystals," *Polymers (Basel).*, vol. 12, no. 1, Jan. 2020, doi: 10.3390/POLYM12010083.

[337] D. Puig and D. Barceló, "Determination of phenolic compounds in water and waste water," *TrAC Trends Anal. Chem.*, vol. 15, no. 8, pp. 362–375, Sep. 1996, doi: 10.1016/0165-9936(96)00057-X.

[338] L. Hu *et al.*, "Carbohydrates-Derived Nitrogen-Doped Hierarchical Porous Carbon for Ultrasensitive Detection of 4-Nitrophenol," *ACS Sustain. Chem. Eng.*, vol. 6, no. 12, pp. 17391–17401, Dec. 2018, doi: 10.1021/ACSSUSCHEMENG.8B05169/SUPPL_FILE/SC8B05169_SI_001.PDF.

[339] S. Chaudhary, S. Kumar, and S. K. Mehta, "Glycol modified gadolinium oxide nanoparticles as

a potential template for selective and sensitive detection of 4-nitrophenol," *J. Mater. Chem. C*, vol. 3, no. 34, pp. 8824–8833, Aug. 2015, doi: 10.1039/C5TC01666E.

[340] M. Jwaili and M. Jwaili, "Pharmaceutical Applications of Gas Chromatography," *Open J. Appl. Sci.*, vol. 9, no. 9, pp. 683–690, Sep. 2019, doi: 10.4236/OJAPPS.2019.99055.

[341] A. Almási, E. Fischer, and P. Perjési, "HPLC Quantification of 4-Nitrophenol and its Conjugated Metabolites from Bile," *Sci. Pharm.*, vol. 79, no. 4, p. 837, 2011, doi: 10.3797/SCIPHARM.1106-22.

[342] D. B. Barr *et al.*, "Measurement of p-nitrophenol in the urine of residents whose homes were contaminated with methyl parathion.," *Environ. Health Perspect.*, vol. 110 Suppl 6, no. SUPPL. 6, pp. 1085–1091, Dec. 2002, doi: 10.1289/EHP.02110S61085.

[343] M. Phichi, A. Imyim, T. Tuntulani, and W. Aeungmaitrepirom, "Paper-based cation-selective optode sensor containing benzothiazole calix[4]arene for dual colorimetric Ag+ and Hg2+ detection," *Anal. Chim. Acta*, vol. 1104, pp. 147–155, Apr. 2020, doi: 10.1016/J.ACA.2020.01.005.

[344] A. M. Abdel-Aziz, H. H. Hassan, and I. H. A. Badr, "Activated Glassy Carbon Electrode as an Electrochemical Sensing Platform for the Determination of 4-Nitrophenol and Dopamine in Real Samples," *ACS Omega*, vol. 7, no. 38, pp. 34127–34135, Sep. 2022, doi: 10.1021/ACSOMEGA.2C03427/SUPPL_FILE/AO2C03427_SI_001.PDF.

[345] Y. Zhang, L. Wu, W. Lei, X. Xia, M. Xia, and Q. Hao, "Electrochemical determination of 4-nitrophenol at polycarbazole/N-doped graphene modified glassy carbon electrode," *Electrochim. Acta*, vol. 146, pp. 568–576, Nov. 2014, doi: 10.1016/J.ELECTACTA.2014.08.153.

[346] H. Xia, W. Zhang, Z. Yang, Z. Dai, and Y. Yang, "Spectrophotometric Determination of p -Nitrophenol under ENP Interference," *J. Anal. Methods Chem.*, vol. 2021, 2021, doi: 10.1155/2021/6682722.

[347] L. Walekar *et al.*, "Functionalized fluorescent nanomaterials for sensing pollutants in the environment: A critical review," *TrAC Trends Anal. Chem.*, vol. 97, pp. 458–467, Dec. 2017, doi: 10.1016/J.TRAC.2017.10.012.

[348] L. Shi, N. Li, D. Wang, M. Fan, S. Zhang, and Z. Gong, "Environmental pollution analysis based on the luminescent metal organic frameworks: A review," *TrAC Trends Anal. Chem.*, vol. 134, p. 116131, Jan. 2021, doi: 10.1016/J.TRAC.2020.116131.

[349] J. Bin Xiong *et al.*, "Fluorescent porous organic polymers for detection and adsorption of nitroaromatic compounds," *Sci. Reports 2022 121*, vol. 12, no. 1, pp. 1–7, Sep. 2022, doi:

10.1038/s41598-022-20024-x.

[350] Y. L. Pak, Y. Wang, and Q. Xu, "Conjugated polymer based fluorescent probes for metal ions," *Coord. Chem. Rev.*, vol. 433, p. 213745, Apr. 2021, doi: 10.1016/J.CCR.2020.213745.

[351] X. Fang, B. Zong, and S. Mao, "Metal–Organic Framework-Based Sensors for Environmental Contaminant Sensing," *Nano-Micro Lett. 2018 104*, vol. 10, no. 4, pp. 1–19, Jul. 2018, doi: 10.1007/S40820-018-0218-0.

[352] B. Jie *et al.*, "Mechanism, design and application of fluorescent recognition based on metal organic frameworks in pollutant detection," *Chem. Eng. J.*, vol. 454, p. 139931, Feb. 2023, doi: 10.1016/J.CEJ.2022.139931.

[353] M. Kaur, S. K. Mehta, and S. K. Kansal, "Nitrogen doped graphene quantum dots: Efficient fluorescent chemosensor for the selective and sensitive detection of 2,4,6-trinitrophenol," *Sensors Actuators B Chem.*, vol. 245, pp. 938–945, Jun. 2017, doi: 10.1016/J.SNB.2017.02.026.

[354] S. Liao *et al.*, "Fluorescent nitrogen-doped carbon dots for high selective detecting p-nitrophenol through FRET mechanism," *Spectrochim. Acta Part A Mol. Biomol. Spectrosc.*, vol. 259, p. 119897, Oct. 2021, doi: 10.1016/J.SAA.2021.119897.

[355] N. T. Ngoc Anh, P. Y. Chang, and R. A. Doong, "Sulfur-doped graphene quantum dot-based paper sensor for highly sensitive and selective detection of 4-nitrophenol in contaminated water and wastewater," *RSC Adv.*, vol. 9, no. 46, pp. 26588–26597, Aug. 2019, doi: 10.1039/C9RA04414K.

[356] "IR Spectrum Table." https://www.sigmaaldrich.com/IN/en/technical-documents/technical-article/analytical-chemistry/photometry-and-reflectometry/ir-spectrum-table (accessed Mar. 13, 2023).

[357] B. Liu *et al.*, "One-Step Synthesis of Boron Nitride Quantum Dots: Simple Chemistry Meets Delicate Nanotechnology," *Chem. - A Eur. J.*, vol. 22, no. 52, pp. 18899–18907, 2016, doi: 10.1002/chem.201603935.

[358] R. Geick, C. H. Perry, and G. Rupprecht, "Normal Modes in Hexagonal Boron Nitride," *Phys. Rev.*, vol. 146, no. 2, p. 543, Jun. 1966, doi: 10.1103/PhysRev.146.543.

[359] H. Türkez, M. E. Arslan, E. Sönmez, M. Açikyildiz, A. Tatar, and F. Geyikoğlu, "Synthesis, characterization and cytotoxicity of boron nitride nanoparticles: emphasis on toxicogenomics," *Cytotechnology*, vol. 71, no. 1, pp. 351–361, Feb. 2019, doi: 10.1007/S10616-019-00292-8.

[360] K. Arunkumar and S. Kalainathan, "Growth and characterisation of organic nonlinear optical single-crystal 4-nitrophenol grown by vertical Bridgman technique," *Appl. Phys. B Lasers Opt.*, vol. 125, no. 4, Apr. 2019, doi: 10.1007/S00340-019-7168-1.

[361] C. Zang *et al.*, "Synthesis, characterization and tribological behaviors of hexagonal boron nitride/copper nanocomposites as lubricant additives," *Tribol. Int.*, vol. 165, p. 107312, Jan. 2022, doi: 10.1016/J.TRIBOINT.2021.107312.

[362] F. Wang, X. Fu, X. Chai, Q. Han, H. Wang, and Q. Hao, "Highly selective fluorometric detection of para-nitrophenol from its isomers by nitrogen-doped graphene quantum dots," *Microchem. J.*, vol. 168, p. 106389, Sep. 2021, doi: 10.1016/J.MICROC.2021.106389.

[363] C. Li, Y. Zheng, H. Ding, H. Jiang, and X. Wang, "Chromium(III)-doped carbon dots: fluorometric detection of p-nitrophenol via inner filter effect quenching," *Microchim. Acta*, vol. 186, no. 6, pp. 1–8, Jun. 2019, doi: 10.1007/S00604-019-3444-3/FIGURES/4.

[364] X. Wang *et al.*, "Nitrogen, silicon co-doped carbon dots as the fluorescence nanoprobe for trace p-nitrophenol detection based on inner filter effect," *Spectrochim. Acta Part A Mol. Biomol. Spectrosc.*, vol. 244, p. 118876, Jan. 2021, doi: 10.1016/J.SAA.2020.118876.

[365] Q. Sun, S. Fang, Y. Fang, Z. Qian, and H. Feng, "Fluorometric detection of cholesterol based on β-cyclodextrin functionalized carbon quantum dots via competitive host-guest recognition," *Talanta*, vol. 167, pp. 513–519, May 2017, doi: 10.1016/J.TALANTA.2017.02.060.

[366] M. Santhiago, C. S. Henry, and L. T. Kubota, "Low cost, simple three dimensional electrochemical paper-based analytical device for determination of p-nitrophenol," *Electrochim. Acta*, vol. 130, pp. 771–777, Jun. 2014, doi: 10.1016/J.ELECTACTA.2014.03.109.

[367] A. D. Arulraj, M. Vijayan, and V. S. Vasantha, "Highly selective and sensitive simple sensor based on electrochemically treated nano polypyrrole-sodium dodecyl sulphate film for the detection of para-nitrophenol," *Anal. Chim. Acta*, vol. 899, pp. 66–74, Oct. 2015, doi: 10.1016/J.ACA.2015.09.055.

[368] A. Dwivedi, M. Srivastava, A. Srivastava, and S. K. Srivastava, "Synthesis of high luminescent Eu3+ doped nanoparticle and its application as highly sensitive and selective detection of Fe3+ in real water and human blood serum," *Spectrochim. Acta Part A Mol. Biomol. Spectrosc.*, vol. 260, p. 119942, Nov. 2021, doi: 10.1016/J.SAA.2021.119942.

[369] M. Wang, L. Guo, and D. Cao, "Amino-Functionalized Luminescent Metal-Organic Framework Test Paper for Rapid and Selective Sensing of SO2 Gas and Its Derivatives by Luminescence Turn-On Effect," *Anal. Chem.*, vol. 90, no. 5, pp. 3608–3614, Mar. 2018, doi: 10.1021/ACS.ANALCHEM.8B00146/ASSET/IMAGES/LARGE/AC-2018-00146S_0004.JPEG.

[370] G. Kalaiyarasan, J. Joseph, and P. Kumar, "Phosphorus-Doped Carbon Quantum Dots as Fluorometric Probes for Iron Detection," *ACS Omega*, vol. 5, no. 35, pp. 22278–22288, Sep. 2020, doi:

10.1021/ACSOMEGA.0C02627/ASSET/IMAGES/LARGE/AO0C02627_0008.JPEG.

[371] T. Shindhal *et al.*, "A critical review on advances in the practices and perspectives for the treatment of dye industry wastewater," *Bioengineered*, vol. 12, no. 1, pp. 70–87, 2021, doi: 10.1080/21655979.2020.1863034/SUPPL_FILE/KBIE_A_1863034_SM9685.ZIP.

List of Publications

1. **Ravi Pratap**, Karishma Niveria, Saurabh Kumar Srivastava, Shilpi Chaudhary, Poonam Sharma, Anita K Verma, **Avanish Singh Parmar*** (2023) *Biogenic Synthesis of Gold Nanoparticles Using Dual Extract of Tulsi-Vinca for Breast Cancer Tumor Regression in Mice*. **Nanomedicine (accepted)**
2. **Ravi Pratap**, Arunava Das, Archana Mishra, Shilpi Chaudhary, **Avanish Singh Parmar** (2023) *Developing a Rapid and Sensitive Colorimetric Sensor for Detection of Food Adulterant Rhodamine-B in Real Samples.* **ChemistrySelect (accepted)**
3. **Ravi Pratap**, VipulVishal, ShilpiChaudhary and **Avanish Singh Parmar*** (2023) *Fabrication of white light emitting diodes via high yield surface passivated carbon quantum dots doped with terbium.* **RSC Advances, 13,** 1974-84.
4. **Ravi Pratap**, Nurul Hassan, Monika Yadav**,** Saurabh Kumar Srivastava, Anita Kamara, Jayeeta Lahiri, **Avanish S. Parmar***, *Biogenic Synthesis of Dual-emission Chlorophyll-rich Carbon Quantum Dots for Detection of Heavy Toxic Metal Ions – Hg (II) and As (III) in Water and Mouse Fibroblast Cell Line NIH-3T3* **(accepted)**
5. **Ravi Pratap, Avanish Singh Parmar*,** *Fluorometric based detect of organic pollutant of para nitrophenol (PNP) with highly selective and sensitive: using boron nitrate quantum dots (BNQDs)* (**To be submitted**)
6. Puja Kumari, **Ravi Pratap**, Veer S. Gautam, Megha Das, Nurul Hassan, Jayeeta Lahiri, Archana Mishra, Sanjeev K. Yadav, Ravindra N. Kharwar, **Avanish S. Parmar*** (2023) *Facile Synthesis of Graphitic Fungal Carbon Dots for Sensing of Food Adulterants and Bio-imaging of Human Kidney Cell Line*. **ChemistrySelect 8** (39), e202302437
7. Gaurav Gopal Naik, **Ravi Pratap**, Debadatta Mohapatra, Shreya Singh, Deepak K Kumar, **Avanish S. Parmar**, Arjun Patra, Alakh N. Sahu (2023) *From Phytomedicine to Photomedicine: Quercetin-derived Carbon Nanodots- Synthesis, Characterization and Healthcare Applications.* **Journal of Materials Science 58** (34) 13744-13761
8. Gaurav Gopal Naik; Reena Madavi; Tarun Minocha; Debadatta Mohapatra; **Ravi Pratap**; Singh Shreya; Pradeep Kumar Patel; Sanjeev Kumar Yadav; **Avanish Parmar**; Arjun Patra; Swaha Satpathy; Mohsin Kazi; Muhammad Delwar Hussain, *Fabrication, characterization, and applications of carbon nanodots derived from cow dung and expired tomato sauces.* **Arabian Journal of Chemistry 17** (2) 105576.
9. Debadatta Mohapatra, **Ravi Pratap**, Vivek Pandey, Singh Shreya, Gaurav Gopal Naik, Subhash C. Mandal, Sunday O. timenyin, Pawan K. Dubey, **Avanish S. Parmar**, Alakh N. Sahu (2023) *Bioengineered dual fuorescent carbon nano dots from Indian long*

pepper leaves for multifaceted environmental and health utilities. **Environmental Science and Pollution Research 30** (18) 52182-52208

10. Debadatta Mohapatra, **Ravi Pratap**, Vivek Pandey, Shreya Singh, Prakash Senapati, Pawan Dubey, **Avanish Singh Parmar**, Alak Niranjan Sahu (2022) *In vitro cancer cell imaging, free radical scavenging, and Fe^{3+} sensing activity of green synthesized carbon dots from leaves of Piper longum.* **Journal of Cluster Science 34** (3) 1269-1290
11. Debadatta Mohapatra, **Ravi Pratap**, Vivek Pandey, Pawan K. Dubey, Ashish K. Agrawal, **Avanish S. Parmar**, Alakh Niranjan Sahu **(2022)** T*inospora Cordifolia Leaves Derived Carbon Dots For Cancer Cell Bioimaging, Free Radical Scavenging, And Fe3+ Sensing Applications.* **Journal of Fluorescence 32**, 275-292
12. Debadatta Mohapatra, Md. Bayazeed Alam, Vivek Pandey, **Ravi Pratap**, Pawan K. Dubey, **Avanish S. Parmar**, Alakh N Sahu **(2021)** *Carbon dots from immunomodulatory plant for cancer cell imaging, free radical scavenging, and metal sensing applications.* **Nanomedicine 16** (23) 2039-2059