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ITO/Cu-TMA/Ag advocates the future advanced applications of gelatinous smart materials and their suitability for use in conductive devices and battery electrolytes.

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1. **Vivek Kumar**, Rishibrind Kumar Upadhyay, Daraksha Bano,Subhash Chandra,Deepak Kumar, Satyabrata Jit and **Syed Hadi Hasan*** The fabrication and characterization of a supramolecular Cu-based metallogel thin-film based Schottky diode. *New Journal of Chemistry*, 2021, 45, 6273-6280.

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3. S Chandra, D Bano, K Sahoo, D Kumar, **V Kumar**, PK Yadav**, S.H. Hasan*** Synthesis of fluorescent carbon quantum dots from Jatropha fruits and their application in fluorometric sensor for the detection of chlorpyrifos *Microchemical Journal*, 2022, 172, 106953

4. Yadav, Pradeep Kumar, Subhash Chandra, **Vivek Kumar**, Deepak Kumar, and **Syed Hadi Hasan.** "Carbon quantum dots: synthesis, structure, properties, and catalytic applications for organic synthesis."*Catalysts* 13, no. 2 (2023): 422

The investigation of newly formed metallogels through the use of Low Molecular Weight (LMW) gelators, and their expected functionalities, is currently characterized by a significant degree of randomness. As a result, this randomness poses substantial challenges when it comes to identifying the types of interactions and elucidating their structural properties. Consequently, there is an anticipation that there will be a more systematic and thorough exploration of metal ion-triggered gelation with LMW gelators, involving the fine-tuning of various weak interactions to tailor the gels for a wide range of applications in the near future.

All of the metallogels that have been synthesized demonstrate conductive properties and exhibit responses to various physical and chemical stimuli. Notably, the Cu-H4L metallogel displays sensitivity to multiple stimuli, such as changes in temperature, exposure to ultrasound, and mechanical agitation. Similarly, both Cu-TMA and Mg-ALA metallogels exhibit conductive behavior. Consequently, these metallogels have the potential to be harnessed for the development of versatile soft materials that respond to multiple stimuli. These materials can find applications in fields such as soft robotics, bioelectronics, soft sensors, catalysis, gel electrolytes, thixotropic materials, optoelectronics, and actuators, among other possibilities in the future. Furthermore, the conductive nature of the synthesized metallogels makes them especially promising for their role in advancing electronic and electrochemical devices