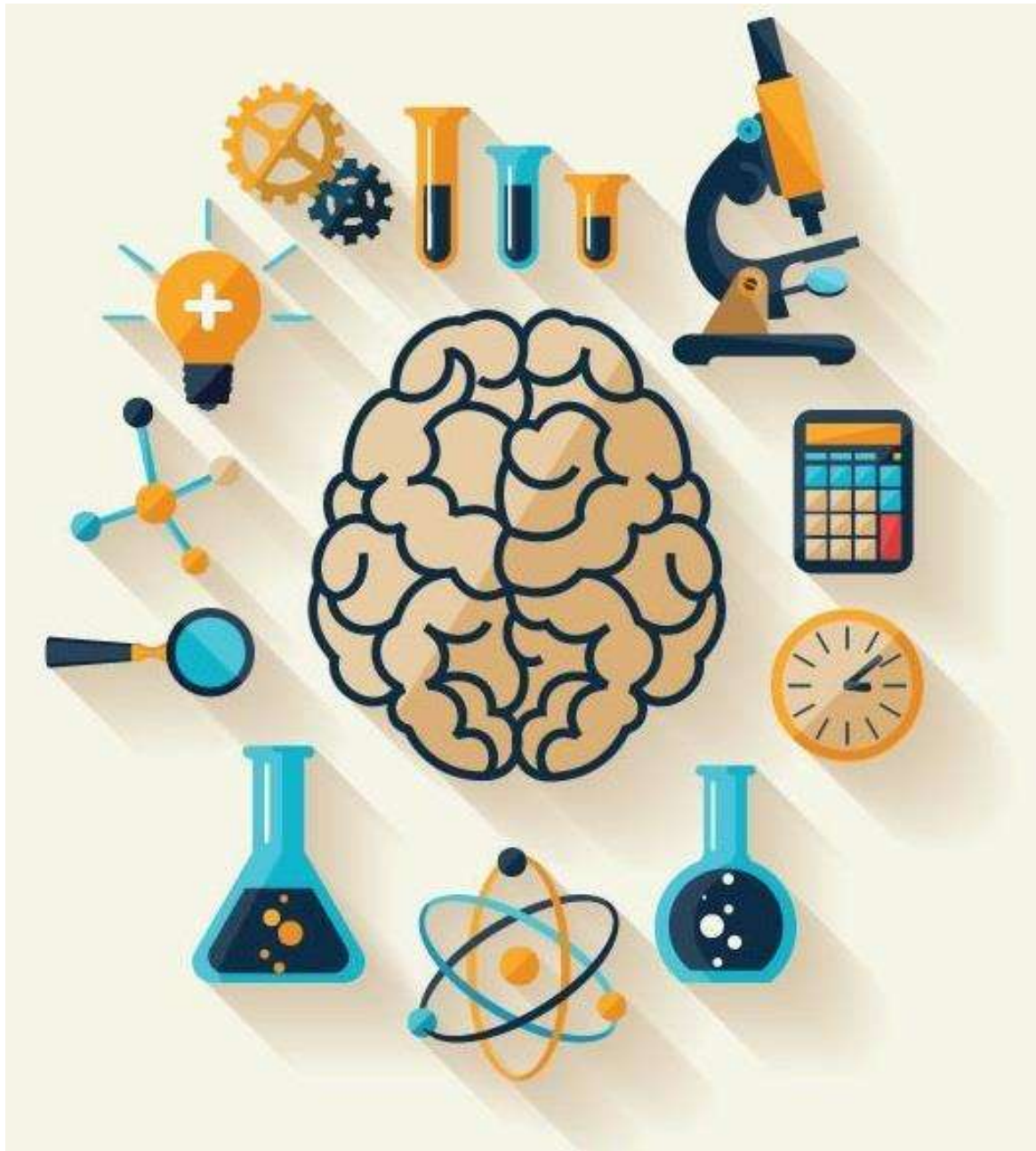


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Appendix



Appendix

GC Calibration and calculation

Calibration factors were used to calculate the mole ratios of different compounds in the product's gaseous mixture. It was defined as

Calibration factor of X with respect to Y,

$$K_{XY} = \frac{\frac{\text{Mole fraction of X in the standard mixture}}{\text{Mole fraction of Y in the standard mixture}}}{\frac{\text{Area of X}}{\text{Area of Y}}}$$

Calculation for samples

Mol fraction of unknown compounds (i)*,

$$\frac{K_{XY} (\text{corresponding gases i}) \times \text{Area of gas (i)}}{\text{Molar fraction of N}_2 \times \text{Area of N}_2}$$

*(i):= (H₂, CO, CH₄, and CO₂).

Gas calibration curve and calculation

For the calculation of Gases, calibration factor of gases (CO, CH₄, CO₂, H₂) with respect to nitrogen were calculated using a standard mixture (Chemtron Science Laboratory, Navi Mumbai) of the following composition of gases in mole %

CH₄: 11 % CO: 11 % CO₂: 15.67 % C₂H₆: 5.26 % H₂: 33.23 % N₂: 23.81 %

Detector: TCD

Carrier Gas: (Argon) flow 30 cc/min

Column: Carbosieve SII

Temperatures:

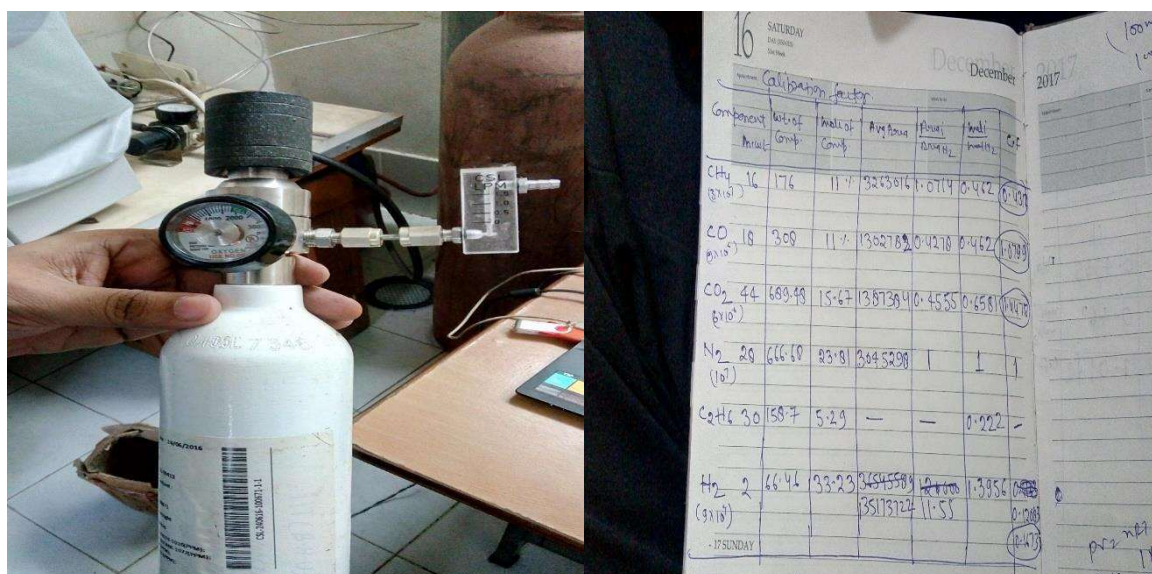
Oven: 80 °C; Injector: 100 °C; Detector: 100 °C

Calibration factor of H₂ with respect to N₂ = 0.1673

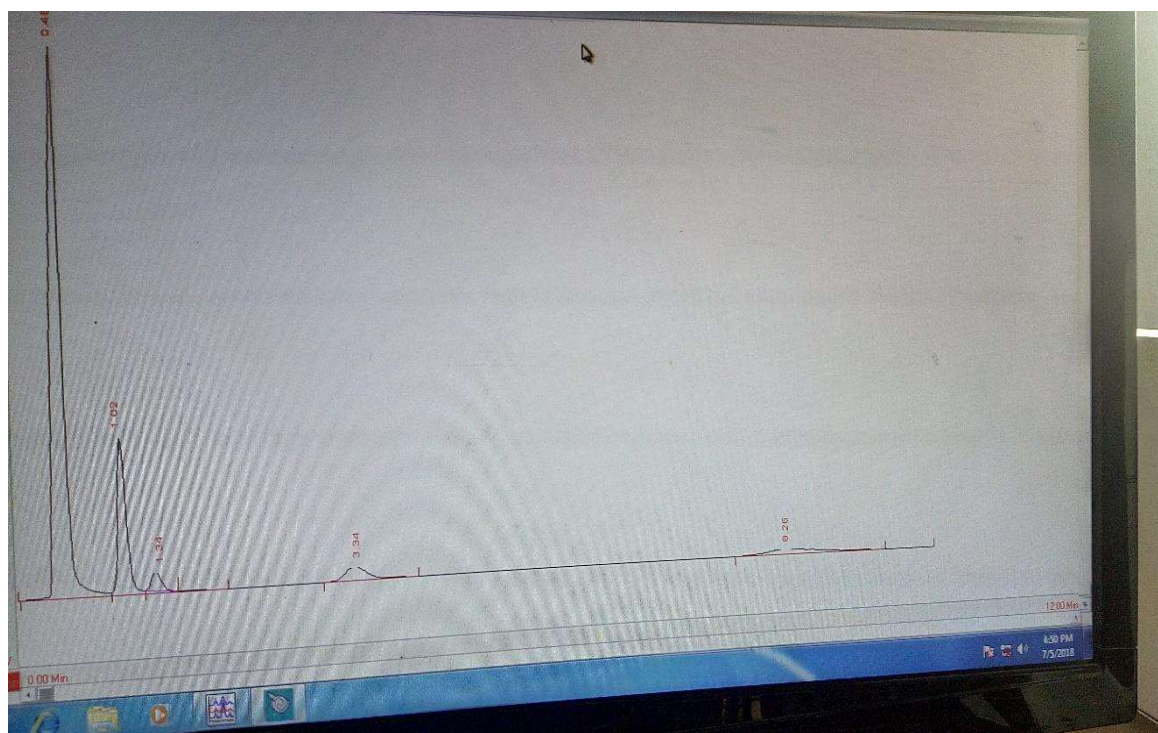
Calibration factor of CO with respect to N₂ = 1.0799

Calibration factor of CH₄ with respect to N₂ = 0.4313

Calibration factor of CO₂ with respect to N₂ = 1.4478



Sample Graph of Experiment



GC calibration for Liquid

Acetic acid calibration curve

Detector: FID

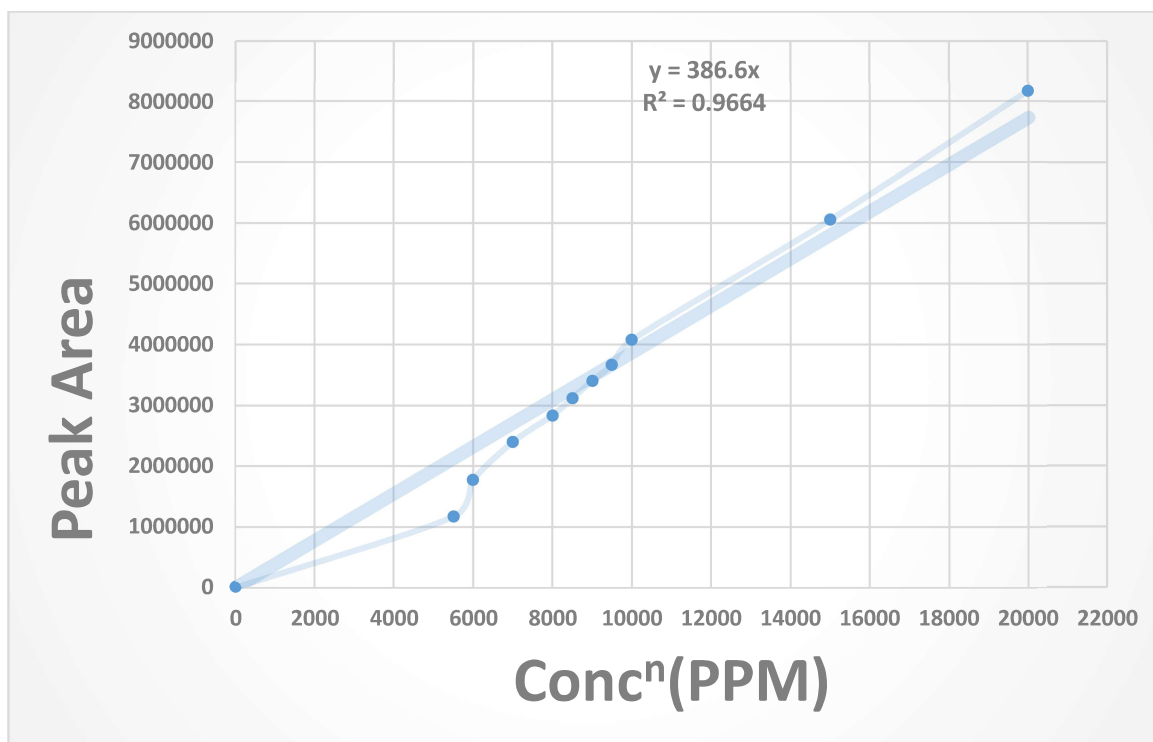
Carrier Gas: (Nitrogen) flow 30 cc/min

Column: Porapak Q

Temperatures:

Oven: 120 °C; Injector: 150 °C; Detector: 150 °C

Concentration (ppm)	Peak Area
0	0
5500	1171096
6000	1774065
7000	2398356
8000	2837590
8500	3119836
9000	3401812
9500	3672278
10000	4077037
15000	6051232
20000	8178986



Acetone calibration curve

Detector: FID

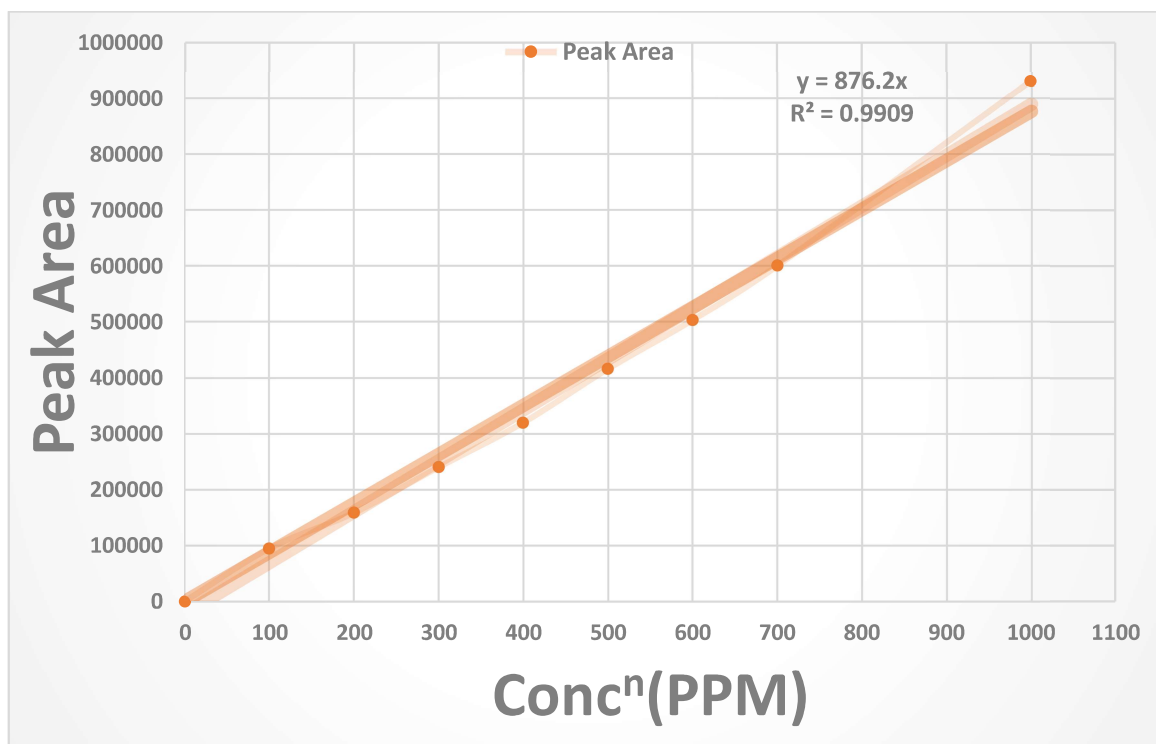
Carrier Gas: (Nitrogen) flow 30 cc/min

Column: Porapak Q

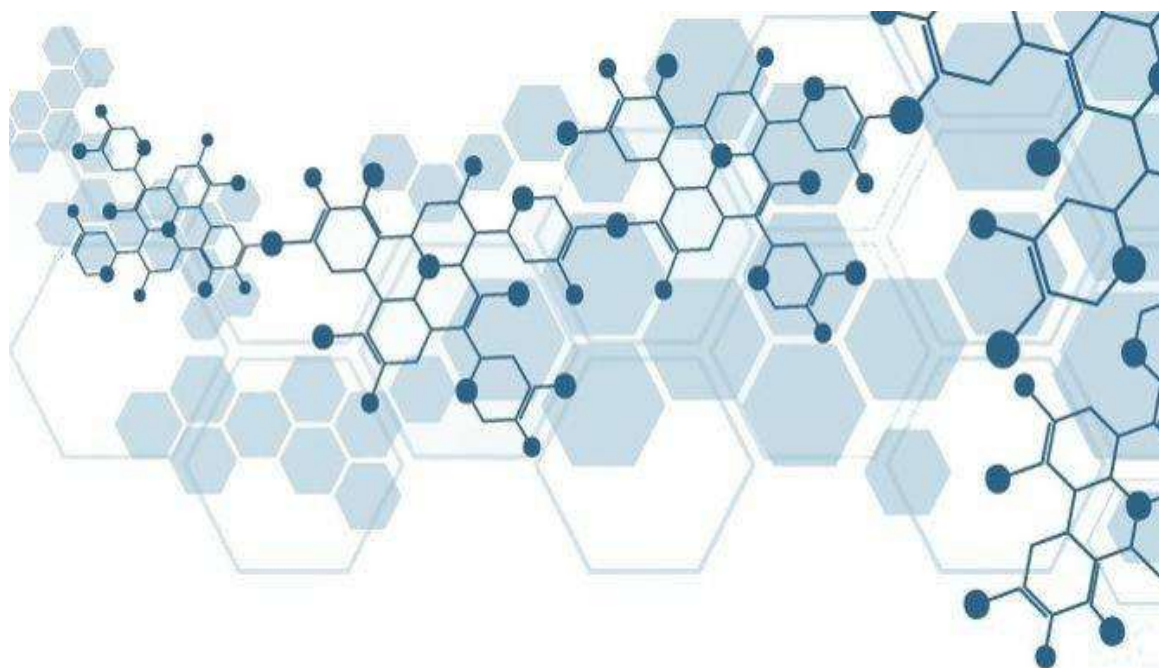
Temperatures:

Oven: 120 °C; Injector: 150 °C; Detector: 150 °C

Concentration (PPM)	Peak Area
0	0
100	94772
200	158549
300	240095
400	319838
500	415942
600	503283
700	600224
1000	931641



List of Publications



List of Publications

1. Ankit Kumar, J.P. Chakraborty & Rupesh Singh (2016): Bio-oil: the future of hydrogen generation, Biofuels, ISSN: 1759-7277. ***I.F. 1.497***
2. Ankit Kumar, Rupesh Singh, & A. S. K. Sinha, 2019: Catalyst modification strategies to enhance the catalyst activity and stability during steam reforming of acetic acid for Hydrogen production. Int J Hydrogen Energy 44 (2019) 12983 - 13010. ***I.F. 4.939***
3. Ankit Kumar, A. S. K. Sinha, 2020: Comparative study of hydrogen production from steam reforming of acetic acid over synthesized catalysts via MOF and wet impregnation methods. Int J Hydrogen Energy. 45 (2020) 11512 -11526. ***I.F. 4.939***
4. Ankit Kumar, A. S. K. Sinha, 2020: Hydrogen production from acetic acid steam reforming over nickel based catalyst synthesized via MOF. **Accepted in Int J Hydrogen Energy. *I.F. 4.939***
5. Ankit Kumar, A. S. K. Sinha, Hydrogen production from Acetic acid steam reforming over MOFs derived Ni-based catalysts: Effect of Ni loading on catalytic activity. (*Manuscript under preparation*)