

## Research Colloquium

### Utilizing Metallogels and Supramolecular Gels for Sensing pH, Temperature Changes, Anions and Nitroaromatics through Fluorescence Variance

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Date: 15/04/2021

Venue: Through online link

Time: 03.00 pm

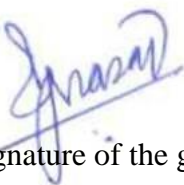
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The recent research advances in supramolecular luminescent materials in diverse areas like solid state lighting, light emitting diodes, display devices, solar cell, sensing and bioimaging inspired researchers to come up with novel self-assembling materials with improved luminescence properties.<sup>1</sup> Supramolecular gels, which combine the dynamic and reversible properties of supramolecular chemistry, are regarded as efficient candidates for developing luminescent materials. Compared to conventional luminescent covalent assemblies, luminescent supramolecular gels exhibit advantageous properties such as multiple stimuli-responsiveness, good reversibility and high processability. Especially, the non-covalent interactions in the assembly can further tune the luminescent properties, as their state of aggregation and energy transfer can be regulated by the self-assembly process.<sup>2</sup>

The colloquium will give a detailed description about the design and synthesis of low molecular weight gelators developed from our laboratory which form gels by supramolecular interactions and their application in fluorescence sensing. We have explored the gelation ability of naturally available citric acid in presence of metal ions and a functional gel has been prepared by adopting mixed ligand approach which not only exhibited white light emission but also showed applications in sensing pH and temperature changes.<sup>3</sup> Further, terpyridine cored poly(aryl ether) and percec type poly (benzyl ether) dendrones were synthesized and their metallogelation with copper was investigated in detail. The copper metallogel could sense cyanide in water with a detection limit of 1.2  $\mu\text{M}$  by fluorescence 'turn-on'. The mechanistic pathways of sensing have been studied and it involves competitive binding of cyanide with copper ion.<sup>4</sup> Further, electron rich thiophenyl carbazole cored dendrones were synthesized and their self-assembly trends were studied in detail. The supramolecular gels formed could selectively detect the presence of nitroaromatics like trinitrophenol by fluorescence quenching. The selective sensing was found to be due to photoinduced electron transfer from the gelator to the electron deficient trinitrophenol. The processability of supramolecular gels enabled the preparation of test strips for practical applications in all the above mentioned cases.

#### References

1) Zheng, B.; Hou, Y.; Gao, L.; Zhang, M. Chinese J. Chem. 2019, 37, 843–854. 2) Sutar, P.; Maji, T. K. Coordination Chem. Commun. 2016, 52, 8055–8074. 3) a) Sebastian, A.; Mahato, M. K.; Prasad, E. Soft Matter 2019, 15, 3407–3417. 4) Sebastian, A.; Prasad, E. Langmuir 2020, 36, 10537–10547.



Signature of the guide

Signature of coordinator

Signature of HOD