

## A Simple, Inexpensive and General Photo-Luminescent Sensor Platform for Multiple Analytes

Uday Maitra

*Department of Organic Chemistry*  
*Indian Institute of Science, Bangalore*  
[maitra@iisc.ac.in](mailto:maitra@iisc.ac.in)

### Abstract:

A few years ago, we discovered a sensitizer-induced enhancement of lanthanide luminescence through the self-assembly of multiple components in a metallohydrogel. Using this strategy, we have developed a ‘*pro-sensitizer*’ based protocol for sensing enzymes and bio-relevant small molecules. We have also discovered that several natural products and clinically used drugs also sensitize lanthanides, and thus the gel-based platform provides opportunities to detect and quantify such species as well.

The advantage of this technique is that the output is independent of the analyte being sensed (green/red photoluminescence of Tb<sup>3+</sup>/Eu<sup>3+</sup>), and in many case pre-processing of the sample is not required. For several enzymes present in blood serum, and natural product extracts the presence of the analyte can be readily inferred using an inexpensive, hand-held long-wave UV lamp. We have also developed a low-cost, paper-based method to simplify the assay and believe that further developments can lead to useful, real-life applications.

### References:

1. Kumar, A.; Sahu, M.; Maitra, U. *Asian J. Org. Chem.* **2021**, *10*, 1695.
2. Gorai, T.; Sakthivel, S.; Maitra, U. *Chem. Asian J.* **2020**, *15*, 4023
3. Bhowmik, D.; Dutta, A., Maitra, U. *Chem. Commun.* **2020**, *56*, 12061
4. Gorai, T.; Maitra, U. *ACS Sensors* **2016**, *1*, 934; *J. Mater. Chem. B* **2018**, *6*, 2143-2150.
5. Laishram, R.; Maitra, U. *Asian J. Org. Chem.* **2017**, *6*, 1235.
6. Bhowmik, S., Maitra, U. *Chem. Commun.* **2012**, *48*, 4624.

### **Bio-Sketch of Speaker**

**Uday Maitra**

Professor

Department of Organic Chemistry

Indian Institute of Science

Bangalore 560012

Tel: 080-2293-2690; e-Mail: [maitra@iisc.ac.in](mailto:maitra@iisc.ac.in)

Homepage: <https://orgchem.iisc.ac.in/uday-maitra/>



After his BSc from Presidency College, Calcutta and MSc from IIT Kanpur, Uday Maitra received his M. Phil and PhD from Columbia University in 1986 working with Prof. Ronald Breslow. Following a postdoctoral stay at the University of California at Berkeley with Prof. Paul Bartlett, he returned to India, and after a year at IIT Kanpur moved to IISc Bangalore in 1989.

His research interests are in the Chemistry of Bile acids; Hydrogels, Metallohydrogels and Organogels; Organic-inorganic hybrid materials; Enzyme sensing, etc. His group has recently developed a general strategy for low cost, paper-based photo-luminescent enzyme sensors.

He is also greatly interested in Chemistry Education and is a regular participant in a variety of outreach programmes for high school and undergraduate students.