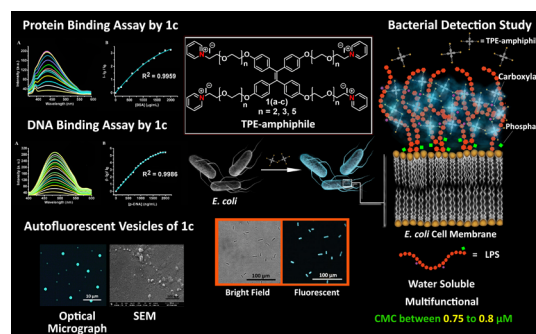


## TPE-Based AIE-Active Smart and Soft Materials for Sensing and Imaging Applications

Mainak Banerjee\*, Viraj G. Naik, Vikash Kumar and Amrita Chatterjee

Department of Chemistry, BITS Pilani, India

Fluorescent probes, in particular, emission based fluorescent “light-up” probes are important tools in the field of bio-medical applications. Tetraphenylethylene (TPE) is the most useful scaffold in making several luminescent materials because of its inherent aggregation induced emission (AIE) property. Recently, growing interests have been shown in designing TPE-amphiphiles derived smart nanoaggregates (e.g. vesicles, nanoparticles) because of their multi-targeting and better binding abilities other than unique encapsulation capabilities for better performance in sensing, delivery, bioimaging, diagnostics and theranostics [1]. These TPE based probes could become more water soluble and bio-compatible by incorporating glycol units in the chain and cationic pyridinium unit at the terminal respectively so that they would be more suitable for biotechnological applications. This unique feature provides an opportunity to design light-up probes as multipurpose auto-fluorescent tool for bio-applications particularly in sensing and cellular imaging.



**Fig. 1 Schematic representation of TPE derived smart amphiphiles (TPE-xEG-Py) and their bio-applications.**

The present talk mainly focuses on the design and synthesis of various water-soluble TPE-amphiphiles with varying spacers, their unique aggregation behaviors in aqueous solutions, fluoremetric detection and quantitation of biomacromolecules such as protein and DNA, detection of bacteria by electrostatic interactions (Fig. 1) [2]. The talk will also cover other TPE-amphiphiles for selective fluoremetric detection and quantitation of biomacromolecules and imaging studies [3].

### References:

- 1.A) Qian, J.; Tang, B. Z. Chem 2017, 3, 56. B) La, D. D.; Bhosale, S. V.; Jones, L. A.; Bhosale, S. V. ACS Appl. Mater. Interfaces 2018, 10, 12189.
2. Kumar, V.; Naik, V. G.; Das, A.; Basu Bal, S.; Biswas, M.; Kumar, N.; Ganguly, A.; Chatterjee, A.; Banerjee, M. Tetrahedron, 2019, 75, 3722.
3. Naik, V. G.; Hiremath, S. D.; Das, A.; Banwari, D.; Gawas, R. U.; Biswas, M.; Banerjee, M.; Chatterjee, A. Mater. Chem. Front. 2018, 2, 2091.

### Biography

Prof. Mainak Banerjee is an Associate Professor at The Department of Chemistry, BITS Pilani, KK Birla Goa campus, Goa, India. He has more than fifteen years of research experience in synthetic organic chemistry and the development of sustainable methods. He has 38 publications (all international), 1 book chapter and 2 patents; total citation: 1070; h-index: 17; i10-index 20; Best cited paper: JACS, 2009, 131, 7524–7525 (no. of citations: 320). He presented his work in more than 30 national and international conferences. He has executed several Government funded and Industry sponsored projects (total cost: ₹. 20.7 million). One of his current research focuses which is related to the conference is “the development of smart soft nanomaterials and their application in sensing and imaging”.