

Carbon- Based Platforms for Sensory Applications

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Graphene oxide (GO) and its reduced form (rGO) have received huge research attention not only because of its unique surface properties but also for its diverse application potential in fields like electronics, biomedical applications, sensors, adsorbents, catalysts, etc. [1]. On the other hand, carbon dots (CDs) have recently emerged as a promising carbon-based nanomaterial with impending applications in various fields, e.g. sensing, bioimaging, catalysis, etc. [2]. In particular, their eco-friendly synthesis, high water solubility, low toxicity, excellent biocompatibility make them sustainable alternatives for the present and future. It is interesting to note that these carbon-based materials possess inherent fluorescence which allows them to be used as label-free fluorescent probes for various “sensory applications”. Often, a judicious choice of quencher/promoter leads to an efficient sensing platform for selective and sensitive detection of analytes. Sometimes, their conjugation with another nanomaterial (e.g MnO₂ nanosheets) is helpful in devising sensing platforms. One of the present research focuses of our laboratory is the development of various carbon-based nanocomposites as efficient sensory platforms for various toxic analytes. For example, an rGO-thioguanine based fluorescent sensing platform was recently developed in our laboratory for label-free detection and discrimination of inorganic and organic mercural in aqueous media. On the other hand, CDs-MnO₂ nanoconjugate can be utilized for the detection of hydrazine (Fig. 1) [3, under revision]. The talk will also cover a glimpse of our research in “sensing and imaging” for the last few years.

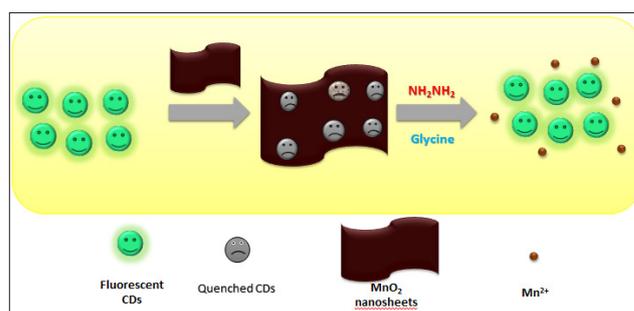


Fig. 1 Schematic representation of hydrazine detection by CDs-MnO₂ nano-conjugate

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2. S. Y. Lim, W. Shen, Z. Gao, Carbon quantum dots and their applications, Chem. Soc. Rev. 2015, 44, 362–381.
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Biography

Dr. Amrita Chatterjee is an Associate Professor at the Department of Chemistry, BITS-Pilani K. K. Birla Goa, India since June 2016. Before that she was in the same department as Assistant Professor since April 2009. Dr. Chatterjee received her Ph.D in Synthetic organic chemistry focusing green chemistry, from Jadavpur University (INDIA) in 2006. She worked as postdoctoral researcher at the Department of Chemistry, POSTECH, South Korea from July 2006 to March 2009 with Prof. Kyo Han Ahn. Her current research focused on Molecular sensors using Aggregation-Induced emission (AIE), ESIPT and conventional dye molecules; Carbon based material for sensing application; nanoparticle based sensors and green chemistry.