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Fabrication of Sustainable Advanced Greener Nanomaterials Employing Wet Chemical Approach †

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Abstract: An increasing usage of nanomaterials for technological advancement has made it indispensable to develop environmentally friendly sustainable materials of different dimension(s) to meet the increasing global requirements of efficient devices/biomedical tools. Over the years, we have evolved various wet synthetic protocols for designing greener functional nanostructures comprising carbon microstructures, semiconductors, metals, and their nanohybrids. Some of our recent work on these nanostructures depicting different applications will be presented. 2-D reduced graphene oxide (rGO)/N-functionalized rGO microstructure(s), and their nanohybrids have been synthesized employing environmentally benign biomolecule(s) as a reducing agent in an aqueous medium under mild conditions of pH and heating. The effect of electrode material and electrolyte(s) to achieve high electrochemical performance will be presented for energy storage and sensing applications.
A novel strategy for fabricating chitosan-mediated Ag-γ-Fe_2O_3 nanohybrids (AgCsIO) and nucleotide-mediated stimuli-responsive soft molecular hydrogels with low toxicity has been adopted following greener protocols. The AgCsIO demonstrated an efficient catalytic activity for the decomposition of certain pollutant dye(s). Nucleotide-mediated hydrogels have exhibited immense potential for fabricating smart materials for biomedical usages like drug delivery and wound healing. Photophysics of bio template II-VI semiconductor nanostructures displaying enormous future potential as strong fluorescing/sensing material will also be discussed. The present talk will demonstrate the potential of the wet chemical approach to design different types of efficient, greener functional nanostructures.

Keywords: Nanomaterials: green methodology; graphene (List three to ten pertinent keywords specific to the article; yet reasonably common within the subject discipline.)

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Conflicts of Interest

The authors declare no conflict of interest.