

Why are nanomaterials different? Architecture of nanocomposites and their applied applications

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Abstract: Nanocomposites are the combination of materials in which one material should be of nanometer (1-100nm) range. This include the nanoporous materials also which are classified as microporous (2nm), mesoporous (2-50nm) and macroporous porous > (50 nm) in length scale are promising materials have unique properties such as low density, considerable thermal conductivity, gas permeability, significant surface/volume ratio, optical properties, mechanical strength and stability hence, such materials are having diverse applications in organic synthesis, heterogeneous catalysis, bio-filtration, adsorption, degradation of dyes and toxic metals, electronics/spintronics, electrochemical sensors, miniature primary cells, aerospace technology, supercapacitors, tissue engineering, cosmetics, computers, self-cleaning cars, paint, food, thermal underwear, defence, targeted drug delivery system, telecommunication, fuel cell technology, and robot surgery. Surface plasmon resonance, dispersion and quantum confinement effect (<10nm) will change their properties. Porous materials of coinage metals such as gold, silver and copper and TiO₂ are the novel materials can be used as catalysts to catalyze several organic reactions such as o-nitrophenol to p-aminophenol, and o-nitroaniline to 1,2 benzene diamine and toxic dyes. Some can be used as degradation of toxic dyes like malachite green and indigo carmine, and some are as sensors and supercapacitors also. In this lecture, nanocomposites of some precious metals with some surfactants will be discussed with their applied applications.

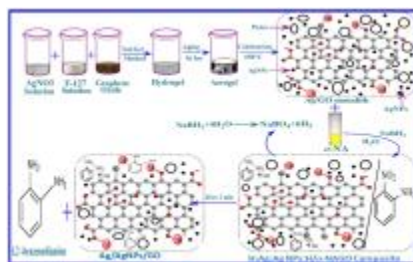


Figure 1: Schematic representation of synthesis of Ag/F-127/GO monolith and reduction of o-NA to 1,2 benzenediamine in presence of NaBH₄

Biography: Prof. Khan has received his M. Sc. & Ph. D. degrees from Dr. H. S. Gour Central University, Sagar in 1979 and 1983 respectively. He is Commonwealth Academic Staff award fellow and worked with Prof. S. Mann, *FRS* in 2008-09 and also INSA visiting fellow in JNCASR, Bangalore with Prof. C. N. R. Rao, *FRS* in 2006. His research interest includes nanocomposites, nanoporous materials, heterogeneous catalysis, sensors and supercapacitors. He has published about 150 research papers in reputed journals. Twenty students have already conferred Ph. D. degree under his supervision.

5th International Conference on Nanotechnology for Better Living (NBL-2019), Jointly organized by National Institute of Technology (NIT) Srinagar and Indian Institute of Technology (IIT) Kharagpur; April 7 – 11, 2019 at SKUAST, Shalimar Srinagar, Jammu and Kashmir, India; Editor: Dr. M. A. Shah and Prof. P. Banerji, ISBN:978-81-939516-0-6; Published by Applied Science Innovations Pvt. Ltd., Pune, Maharashtra, India.