

Single Step Hydrothermal Synthesis Of Nitrogen Doped Carbon Coated Ultra Small Iron Oxide Core Shell Nanoparticles (Nic) And Nitrogen Doped Carbon Dot Nanoparticles (Ncd)

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ABSTRACT

Present invention relates to single step hydrothermal synthesis of nitrogen doped carbon coated ultrasmall iron oxide core shell nanoparticles (NIC) and nitrogen doped carbon dot nanoparticles (NCD) wherein the said synthesis process comprises of in-situ nitrogen doping in both the said products. It also discloses a method of magnetic separation and column chromatography purification of both NIC and NCD. Lastly an important aspect of present invention is related to the use of both the said products in the bioimaging and biosensing studies in biomedical applications.

KEY APPLICATION AREAS

- 1.Semiconductor device fabrication.
- 2.Microelectronics and IC manufacturing.
- 3.Photolithography for sub-micron patterning.
- 4.MEMS and nanoelectronics fabrication.
- 5.Nanophotonics and LED manufacturing.
- 6.Space, defence, aerospace, railway, and electronics industries.

POTENTIAL USE

- 1.Fabrication of semiconductor devices and integrated circuits (ICs) with high-resolution lithography.
- 2.Patterning sub-micron features ($\leq 700\text{--}750\text{ nm}$) with sharp sidewall profiles and minimal thickness loss.

3. Microelectronics, MEMS, VLSI, and nanoelectronics manufacturing.

4. LED, nanophotonics, and hard disk drive fabrication.

5. Patterning on silicon, GaN, sapphire, quartz, aluminium, and silicon dioxide substrates.

6. Advanced electronics fabrication for space, defence, aerospace, railway, and agriculture applications.