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Shape evolution of CdS nanoparticles under the influence of nanosecond laser

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Physicochemical properties and reactivity of nanoparticles (NPs) are determined to a high degree by their shape and thus their surface facets. Shape is important in various applications, such as catalysis, solar cells, light-emitting diodes, and biological labeling. A general approach to tune NP shapes is to adjust the types of ligands and their relative concentration so that certain crystallographic facets are favored during growth, or in a two-phase shape control where already formed NPs undergo a morphological transformation due to the addition of compounds which protect specific crystallographic facets. In a new approach, we present a shape evolution of CdS from spherical to rod-shaped NPs by the irradiation of the pre-synthesized nanoparticles with laser. The CdS NPs were characterized by powder XRD, TEM, UV-visible and fluorescence spectroscopy. The results revealed two distinguishable stages in the shape evolution. The nanocrystals growth began along the c-axis of the wurtzite structure after a short irradiation to give a mixture of anisotropic shapes, and continues resulting in the long axis of the rods.

Biography

Damian Onwudiwe obtained his PhD from the University of Fort-Hare, RSA in 2011. His doctoral thesis was on Inorganic-materials chemistry with focus on synthesis and characterization of metal complexes, and their use as single molecule precursor for metal sulphide nanoparticles. Compound semiconductor nanoparticles with potential applications in photovoltaic and light emitting diodes were of specific interest. He is currently a Postdoctoral research fellow at North-West University, RSA where he conducts research on laser enhanced synthesis of nanoparticles, nanocomposite, and nanoporous materials. He has published more than 25 papers in reputed journals and serves as reviewer for some journals of repute.

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