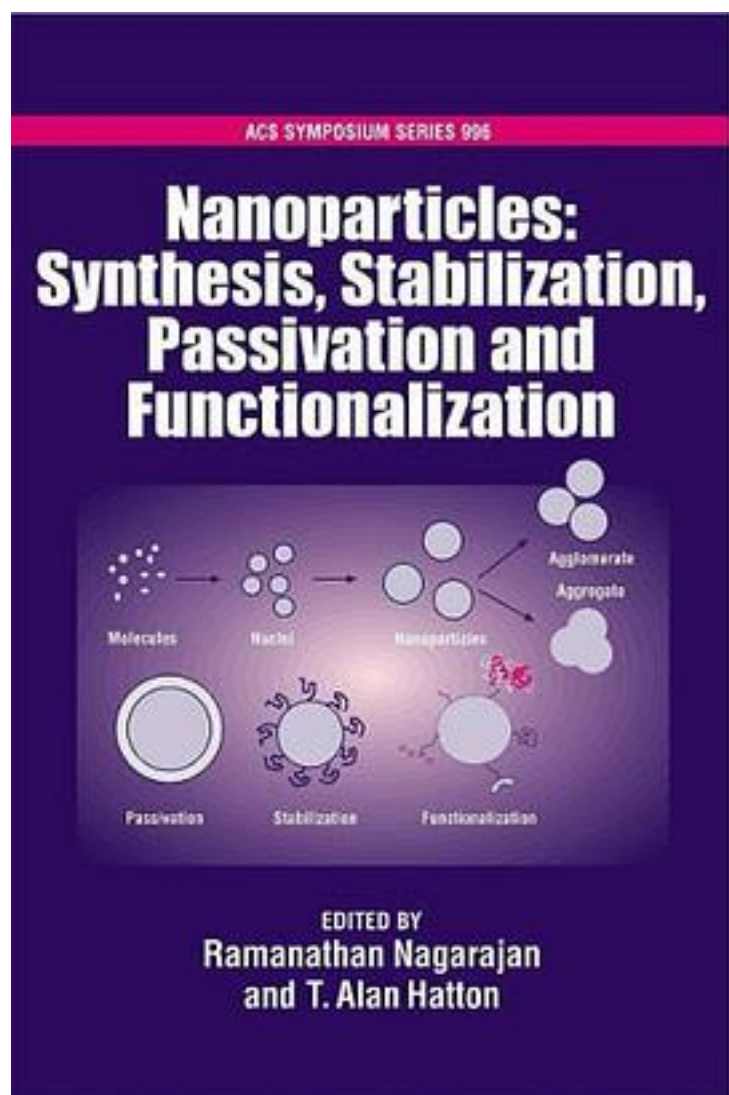


Nanoparticles Synthesis, Stabilization, Passivation and Functionalization



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出版者:

出版时间:2008-9

装帧:

isbn:9780841269699

Recent advances in the synthesis, stabilization, passivation and functionalization of a wide range of metal, metal oxide, semiconductor and other inorganic, polymer, organic, carbon and biological nanoparticles are reported in this book. Diverse shapes of nanoparticles are discussed here including spheres, cubes, nanorods, nanowires, nanotubes, nanocapsules, and nanopyramids. In the section on metals, one can find description of colloidal and wet chemical approaches to synthesize nanoparticles, methods to control number of functional groups and to attain aqueous dispersibility, impact of stabilizers on SERS activity, and ways to tune plasmon resonance via nanoparticle shapes. A time dependent density functional theory to evaluate adsorption properties of passivating ligands is also developed. The section on metal oxides describes surfactant aided formation and stabilization of iron oxide nanoparticles, the synthesis of titania nanotubes, and a hydrothermal condensation method to prepare nanowires of vanadium pentoxide. The section on semiconductor and inorganic nanoparticles includes details of the preparation of quantum dot surfactants as Langmuir Blodgett films, the synthesis of fluorinated organics silica composite nanoparticles, the kinetics of silver sulfide nanoparticle formation, the preparation of ultra bright silica nanoparticles and of nanoporous membranes from silica nanoparticle crystalline films, and a comprehensive view of microwave synthesis methods. The section on polymeric nanoparticles describes a ligand exchange strategy to synthesize polymer functionalized ferromagnetic nanoparticles, ROMP polymerization to produce polymer overlayers on nanoparticles, colloidal approaches to polysaccharide covered nanoparticles, and self assembly approach to stable polymer nanoparticles of controlled size. The final section includes a novel method to crystallize organic nanorods as branches on semiconductor nanoparticles, the use of tobacco mosaic virus as a template to prepare composite nanofibers, the synthesis of antibody functionalized gold nanorods of various aspect ratios for SPR based biosensing, and methods to stabilize aqueous dispersions of single wall carbon nanotubes using gamma cyclodextrins. In a fast growing field, this book offers both the beginning and advanced researchers, important details on creating nanomaterials and fruitful directions to follow.

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