Xiaoming Sun et al., J Chromatogr Sep Tech 2015, 6:4
http://dx.doi.org/10.4172/2157-7064.S1.010

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Separation Techniques

August 10-12, 2015 San Francisco, USA

Nanoseparation- From methodology to application

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Density gradient ultracentrifugarion (DGU) separation method was established to obtain monodispersed colloidal nanostructures. Such separation method was demonstrated as a versatile method for acquisition of monodispersed colloidal nanoparticles which are hard to be synthesized. This separation method was applicable to both aqueous (polar) and organic (non-polar) solvents systems; and NPs with different size, density and morphology can be separated. Separation objects involve nearly all kinds of materials including metal and metal oxides/sulfides, carbon materials, semiconductors, etc. Synthesis-structure-property relationships were observed on the separated NPs, which guided synthetic optimization. Besides separation, concentration and purification of NPs could be achieved at the same time when a water/oil interface was introduced into the separation system. By introducing a reaction zone or an assembly zone in the gradient, we can monitor the reaction and assembly of NPs since reaction time could be controlled and chemical environments could be changed extremely fast. In short, "Lab in a tube" method paved a way for the research on nanoparticle synthesis optimization, purification, assembly and surface reactions.

Biography

Xiaoming Sun completed his PhD from Tsinghua University and Postdoctoral studies in Prof. Hongjie Dai's group at Stanford University. He is currently the Vice President of inorganic chemistry department in Beijing University of Chemical Technology. His research interests focus on controlled synthesis, separation, assembly and property regulation of functional inorganic nanomaterials and carbon materials. He has published more than 60 research papers as the first author or corresponding author in journals including *J. Am. Chem. Soc., Angew. Chem. Int. Ed., Adv. Mater. and Chem. Eur. J.* They have been cited more than 3500 times in total.

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