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Growth Mechanism Study of Carbon Nanospheres Synthesized using Green Hydrothermal Technique M. DOORLEY, Southwest Community College, Memphis, TN, S.R. MISHRA, M. LARADJI, S.K. KARNA, The University of Memphis, Memphis, TN, R. GUPTA, K. GHOSH, Missouri State University, Springfield, IL — An attempt is made to understand the growth kinetics of carbon nanospheres (CNS) synthesized using a green technique. An aqueous solution of glucose, was hydrothermally treated to produce porous CNS with homogeneous size distribution, smooth surfaces, and high porosity. The growth kinetics of CNS was studied by evaluating TEM images as a function of hydrothermal reaction time and temperatures. CNSs with tight size distribution in the range of 100-200nm were successfully synthesized. Raman spectra revealed the presence of short-ordered graphitic nanostructures in an amorphous carbon matrix. FTIR spectroscopy confirms the carbonization of glucose and shows the presence of surface hydroxyl groups on CNSs. BET surface area analysis show that the equivalent pore volume is about 50 percent for all nanoparticles. Based on various experimental observations it is proposed that the growth of CNSs is dictated by a reaction-controlled mechanism where long chain glucose-based oligomers bond to the CNS surface. The narrow size distribution and highly hydrophilic surface of these amorphous CNS makes them potential candidates for biomedical applications.

S.R. Mishra
The University of Memphis, Memphis, TN

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