

Facile One-pot Synthesis of High Quality Silver Nanoparticles using Multifunctional Polymer

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In the present era of modern science and nano-technology, silver nanoparticles in particular emerged as a subject of special interest due to their remarkable performance in various fields such as tunable localized surface plasmon resonance (LSPR), biosensors materials, printed electronics and antimicrobial technology. All of these applications required high quality silver nanoparticles, with the essence of scale-up and green chemistry perspectives. Accordingly, we hereby report facile synthesis of high quality silver nanoparticles in aqueous media. The synthetic process was exemplified by the reduction of silver nitrate in the presence of polyethyleneimine (PEI), a sterically hindered branched multi functional polymer. The reduction of Ag⁺ ions was accomplished by utilizing the reduction capability of polyamines, and the stabilization of as synthesized Ag nanoparticles was authenticated by branched and bulky structure of polymer chains. The proposed method is readily amenable to large-scale synthesis due to mild, simple reaction conditions, and high yields.