

Synthesis of thiol capped silver nanoparticles using 1-butyl-3-methylimidazolium chloride

이영은, 이채구, 유성식*
한국기술교육대학교
(ssyou@kut.ac.kr*)

Silver nanoparticles are used and investigated widely for medical and biological applications since the antimicrobial effect of silver ions is well known. In addition, it is commonly produced in solutions by reducing silver nitrate (AgNO_3) in the presence of stabilizing ligands (e.g., sodium citrate or alkane thiols). In this work, dodecanethiol capped silver nanoparticles were synthesized by two phase methods using 1-butyl-3-methylimidazolium chloride ([BMIM][Cl]) at atmospheric temperature and pressure without organic stabilizer. Unlike particles synthesized by an organic phase method, the synthesis of the nanoparticles in our work was carried out by the ligand exchange method at low temperature. The ionic liquid in this reaction was used as solvent and stabilizer to efficiently tune the particle growth and prevent interparticle aggregation. The characterization of synthesized silver nanoparticles by UV-vis spectroscopy, high resolution transmission electron microscopy (TEM) indicated average size of the silver nanoparticles and their spherical shape. The stabilization mechanism of Ag nanoparticles by ionic molecules was also studied by FT-IR and thermogravimetric analysis (TGA).