

Synthesis of platinum nanoparticles by using liquid plasma

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Platinum nanoparticles were synthesized in ionic liquid (1-Butyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide) or ethylene glycol by radio frequency plasma. Transmission electron microscopy, x-ray diffraction and X-ray photoelectron spectroscopy were used to characterize the nanoparticles. The results have shown that the nanoparticles have good shapes of nanocubes and nano-octahedra and well-controlled sizes in the range 2-3 nm. Their shapes directly related to the crystal nucleation along various directions of the {100} cubic, {111} octahedral and {111} facets during synthesis. In addition, various irregular shapes of Pt nanoparticles have been observed. We can conclude that the IL plays a role in stabilizing and controlling the formation and development of Pt nanoparticles.