

Sonolytical Preparation of Nanoparticles and Regulation of their Size and Structure

Yasuaki Maeda*, Masafumi Watanabe, Hiroyuki Inoue, and Rokuro Nishimura
Osaka Prefecture University

Sonolytical preparation of transition-metal or noble-metal nanoparticles and their structural and size control has been investigated. Core-Shell structured bimetallic nanoparticles of Iron-Gold, Iron-Platinum, Iron-Palladium, Copper-Palladium were produced during the irradiation of ultrasound of 200kHz in the presence of surfactant. Sizes of nanoparticles could be controlled by adjusting the concentration of metal ions, concentration or kind of surfactant. Larger size nanoparticles could be obtained at higher concentration of metallic ions and with neutral surfactant such as polyethylene glycol monostearate. Smaller size nanoparticle could be obtained at higher reduction rate of metal ions. Core-shell structured nanoparticles of iron and noble metal have higher catalytic activity for the hydrogenation of unsaturated double bond. Core-shell bimetallic nanoparticles supported on the titanium oxide was also prepared and photo-catalytic activity of the degradation of halogenated hydrocarbon were examined.