

Method for immobilization of catalyst using monodisperse metal nanoparticles and polyelectrolyte multilayer

김보열, 김종민, 무하마드 라티프, 정영민¹, 이창수*
충남대학교 화학공학과; ¹SK에너지
(rhadum@cnu.ac.kr*)

In catalysis, nanoparticles have a characteristic high surface-to-volume ratio, and consequently a large fraction of the metal atoms are at the surface, and hence have a good catalytic effect. So, metal nanoparticles are used in many catalytic reactions. However, metal catalyst such as gold, silver, palladium has high cost. Thus, metal catalysts need the ability of reuse and recover. Recently, many reasercher use the metal catalyst immobilized on stationary phase such as zeolite, polymer resin, and alumina. However, metal catalyst leach from carrier in chemical reactions.

In this research, we establish the method for immobilization of catalyst using monodisperse metal nanoparticles and polyelectrolyte multilayer. Metal nanoparticles is synthesized by thermal decomposition and modified with negative charged ligand with high monodispersity. Polymer resin is coated by polyelectrolyte multilayer using facile method. Surface modified metal nanoparticles immobilize on the treated polymer resin by electrostatic interaction. We demonstrated the immobilization method has no leaching of metal nanoparticles. The proposed method will be useful for the catalytic reaction such as hydrogenation, oxidation, and synthesis of hydrogen peroxide.