

Kinetic aspects of recovery of palladium salts(II) in the presence of hydroxyl-containing compounds

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Abstract

In this paper has been investigated the reducing ability of hydroxyl-containing compounds in the PdCl₂ - H₂O - R (OH)_n - NaCl with the formation of nanoscale particles of palladium. It has been shown that in aqueous-organic media particle sizes Pd⁰ largely determined by the nature and concentration of hydroxyl-containing compounds, which allows to obtain the required size of the palladium particles. It has been established that the reactivity of the compounds increases in the order: aliphatic alcohols - double, trihydric alcohols - hydroxy acids.

Mechanism of the reaction that has been proposed includes the stage of forming aquachloride complexes of palladium with alcohols or hydroxy acids, stage of aggregation and stabilization of palladium nanoparticles using molecules of hydroxyl compounds. It has been shown, that the introduction of water-soluble polymers PVA and PVP significantly increases the stabilizing effect of the nanoparticles Pd⁰ and leads to a decrease of their size, and in the case of the PVA was observed polymer flocculates containing particles Pd⁰.

The influence of UV - radiation leads to a noticeable increase the rate of reaction of reduction of palladium ion in agreement with the mechanism of the UV-activation of water molecule in aquachloride complexes of palladium.