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研究论文

Kinetics of Oxidation of L-Leucine by Mono- and Bimetallic Gold and Silver Nanoparticles in Hydrogen Peroxide Solution

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摘要 The catalytic activity of surfactant stabilized mono- and bimetallic Au and Ag nanoparticles for the oxidation of an amino acid, L-leucine, was studied using hydrogen peroxide as the oxidant. The Au and Ag nanoparticle catalysts exhibited very good catalytic activity and the kinetics of the reaction were found to be pseudo-first order with respect to the amino acid. The effects of several factors, such as oxidant concentration, ionic strength, pH, and catalyst concentration on the reaction, were also investigated. In particular, optimal oxidant and catalyst concentrations were determined. Very high concentrations of the metal nano-catalysts or the oxidant led to a dramatic increase in reaction rate. Moreover, bimetallic Au-Ag catalysts provided higher selectivity than pure Au or Ag.

关键词： gold nanoparticle silver nanoparticle gold/silver bimetallic nanoparticle oxidation of α-amino acid leucine hydrogen peroxide kinetic study

Abstract： The catalytic activity of surfactant stabilized mono- and bimetallic Au and Ag nanoparticles for the oxidation of an amino acid, L-leucine, was studied using hydrogen peroxide as the oxidant. The Au and Ag nanoparticle catalysts exhibited very good catalytic activity and the kinetics of the reaction were found to be pseudo-first order with respect to the amino acid. The effects of several factors, such as oxidant concentration, ionic strength, pH, and catalyst concentration on the reaction, were also investigated. In particular, optimal oxidant and catalyst concentrations were determined. Very high concentrations of the metal nano-catalysts or the oxidant led to a dramatic increase in reaction rate. Moreover, bimetallic Au-Ag catalysts provided higher selectivity than pure Au or Ag.

Keywords： gold nanoparticle, silver nanoparticle, gold/silver bimetallic nanoparticle, oxidation of α-amino acid, leucine, hydrogen peroxide, kinetic study

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