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Selective Detection of ZnO Nanoparticles in Aqueous Suspension by Capillary Electrophoresis Analysis using Dithiothreitol and L-Cysteine Adsorbates

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Abstract

The UV detection sensitivity of ZnO nanoparticles in capillary electrophoresis (CE) analysis was selectively enhanced, by 27 or 19 folds, after adsorption of dithiothreitol (DTT) or cysteine (Cys) in 10 mM sodium phosphate buffer. Adsorption equilibrium was reached within 90 min for DTT but only 10 min for Cys. The adsorption process was best modeled by the Langmuir isotherm, indicating the formation of a monolayer of DTT or Cys on the surface of ZnO nanoparticles. The selectivity of DTT and Cys towards ZnO nanoparticles was tested using alumina (Al_2O_3), ceria (CeO_2), silica (SiO_2) and titania (TiO_2) nanoparticles. No changes in the CE-UV peak

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