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Ultrasensitive Speciation Analysis of Silver Ions and Silver Nanoparticles with a CdSe Quantum Dots Immobilized Filter by Cation Exchange Reaction

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Abstract: A novel method was developed for speciation of silver and silver nanoparticles (AgNPs) in antibacterial textiles and drugs based on cation exchange reaction with a CdSe quantum dots (QDs) immobilized filter by hydride generation (HG)-atomic fluorescence spectrometer (AFS). About 60-fold equivalents of Cd^{2+} in CdSe QDs can be exchanged simply by injected one equivalent Ag^{+} solution in CdSe QDs immobilized filter at room temperature, while this cation exchange reaction did not occur when only silver nanoparticles were injected. Based on this striking difference, the ultrasensitive and simple speciation analysis of Ag^{+} and AgNPs without using any pretreatment, chromatographic separation and centrifugation separation was accomplished via the determination of the released Cd^{2+} using