Abstract

Atomization of arsine in a novel hydride atomizer for atomic absorption spectrometry (HG-AAS) was thoroughly optimized. This plasma atomizer is based on a dielectric barrier discharge (DBD). Sensitivity and detection limit reached 0.48 s ng^{-1} As and 0.16 ng ml^{-1}As, respectively, under optimum atomization conditions (Ar discharge using a flow rate of 60 ml min^{-1} Ar, DBD power 17 W). Analytical figures of merit reached in DBD are comparable to those found in an externally heated quartz tube multiatomizer (MMQTA) that was chosen as a model of conventional approach to hydride atomization in HG-AAS. An extent of interferences (Se, Sb, Bi) during As determination was investigated comparing both MMQTA and DBD atomizers. The later one was found to be more resistant towards interferences. A simple preconcentration of As in a DBD atomizer was reached after oxygen introduction into the Ar plasma in the DBD resulting in analyte retention in the atomizer followed by its volatilization once the oxygen flow is switched off. Preconcentration efficiency of 100 % was reached and detection limit improvement by a factor of ten was achieved (0.01 ng ml^{-1} As, preconcentration period 300 s).