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Determination of Mercury(II) by Electrochemical Cold Vapour Generation and Electrothermal Atomic Absorption Spectrometry

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A modification of the method for determination of Hg(II) is described. The proposed method is based on batch electrochemical generation of mercury atoms from the aqueous solution, coupled with electrothermal atomic absorption spectrometry. Several parameters influencing the cold vapour generation of mercury atoms, their trapping on the coated graphite tubes, and atomisation process have been investigated. Ir-, W-, and Zr- coated graphite tubes were used for trapping the mercury vapour at room temperature. It was found that Ir-coated graphite provided the best sensitivity of the determination. Thus, this coating was used to trap mercury prior to atomisation. Potential interferences from several ions, such as Cu(II), Co(II), Ni(II), Mg(II), Ca(II), Al(III) Pb(II), Ag(I), Cd(II), Sb(III), Se(IV), As(III), Bi(III), Li(I), Na(I), K(I), Br^-, I^-, Cl^-, NO_3^- were studied, as well as the methods of their removal were proposed. Under the optimum conditions the calibration plot was linear over the mercury concentration range of 3–100 ng mL^{-1}; detection limit was 1 ng mL^{-1} and RSD equaled to 3% (n = 5) for 40 ng mL^{-1} Hg(II). The accuracy of the method was evalua-ted by performing the analysis of tap and river water samples spiked with the analyte.