Catalytic Adsorptive Stripping Voltammetric Determination of Chromium(VI) in the Presence of a Great Excess of Surfactants

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The catalytic adsorptive stripping voltammetric (CADSV) determination of Cr(VI) is based on the adsorptive accumulation of the active Cr(III)-DTPA (diethylenetriamine-N,N,N',N'',N'''-pentaacetic acid) complex, which is formed instantaneously on the electrode surface as a result of Cr(VI) reduction to Cr(III), its subsequent complexation with DTPA, the adsorption of the Cr(III)-DTPA complex at the surface of the HMDE, its reduction to Cr(II)-DTPA, and the utilization of the catalytic reaction in the presence of nitrate [1-3]. This excellent method has found wide application in Cr(VI) speciation studies conducted for various water samples. However, organic surface-active substances (SAS) present in a great excess in polluted waters and sewage may adsorb at the electrode surface, disturbing Cr(VI) determination or, in extreme cases, making it impossible [4]. To eliminate the above interferences, the removal of SAS via their selective adsorption on the XAD-7 Amberlite resin directly in the voltammetric vessel was tested. Such a procedure appears to be very efficient and provides accurate and precise results of Cr(VI) quantification. The CADSV method combined with the adsorption of SAS on the XAD-7 Amberlite resin was successfully applied for the determination of Cr(VI) in river water samples severely polluted with chromium originating from tannery waste.

KEYWORDS: chromium(VI), catalytic adsorptive stripping voltammetry, diethylenetriamine-N,N,N',N'',N'''-pentaacetic acid

REFERENCES:


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