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Catalytic Spectrophotometric Determination of Chromium

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Abstract: The catalytic effect of chromium(III) and chromium(VI) on the oxidation of sulfanilic acid by hydrogen peroxide was studied. The reaction was followed spectrophotometrically by measuring the absorbance of the reaction product at 360 nm. Under the optimum conditions 2 calibration graphs (for chromium(III) up to 100 ng mL^{-1}, and for chromium(VI) up to 200 ng mL^{-1}) were obtained, using the ``fixed time'' method with detection limits of 4.9 ng mL^{-1} and 3.8 ng mL^{-1}, respectively. The results suggest that at the reaction conditions chromium(VI) is reduced and chromium(III) is oxidized to an intermediate oxidation state and the catalytic action of chromium is due to the formation of an active complex between oxidant, catalyst and substrate. A new catalytic spectrophotometric method for the determination of chromium was developed. The proposed method was successfully applied to chromium determination in tap and industrial waters.

Key Words: Chromium, catalytic determination, sulfanilic acid, hydrogen peroxide, tap and industrial waters

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