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A SIMPLE ELECTROPHORESIS METHOD FOR THE SIMULTANEOUS DETERMINATION OF CHROMIUM AND VANADIUM AT TRACE LEVELS IN REAL AND ENVIRONMENTAL SAMPLES

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A very simple, selective and highly sensitive capillary electrophoretic method for the simultaneous determination of chromium (III) and vanadium (V) with Mo(VI)-P(V) reagent has been developed. A Mo(VI)-P(V) reagent reacted with a mixture of trace amounts of chromium (III) and vanadium (V) to form the stable heteropoly anions in 0.1M acetate buffer (pH 2.0) at room temperature (25±50C). Both anionic forms of chromium (III) and vanadium (V) can be determined simultaneously by capillary electrophoresis with direct UV detection at 254-nm. The pre-column complex formation reaction is instantaneous, and absorbance remains stable for 24h. Linear calibration curves were obtained in the concentration ranges of 0.06–60-mgL^{-1} and 0.05–80-mgL^{-1} of Cr(III) and V(V), respectively; the detection limits were 6.0-µg L^{-1} and 5.0-µg L^{-1}, respectively. The influence of several experimental parameters on both sensitivity and efficiency was investigated. The interference from over 50 cations, anions and complexing agents has been investigated at 1-mgL^{-1} of Cr and V, respectively. The unique selectivity and sensitivity of the method allowed its direct application to the determination of Cr and V in complex matrices of certified reference materials and synthetic seawater. The developed was also used successfully in the determination of chromium and vanadium in environmental waters (tap, well and lake). The method has high precision and accuracy (s=±0.02 for 0.5 mg L^{-1}).

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