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Application of dahlia-like molybdenum disulfide nanosheets for solid phase extraction of Co(II) in vegetable and water samples

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Abstract

Recently, molybdenum disulfide has been attracted considerable attention due to its unique three layered structure. Adsorption sites with abundant electron density on edges and surfaces of MoS₂ can adsorb different metal ions with no need to ligand and functionalization. In this study, dahlia-like MoS₂ nanosheets were prepared by a simple hydrothermal method and characterized using different tools such as FESEM, TEM, EDX, XRD, DLS and zeta potential measurements. Then, they were applied for solid phase extraction of Co(II) as an example of heavy metals. Different factors (the pH, adsorbent amount, contact time, type of eluent, matrix and reusability) affecting the extraction process were studied. Under optimum conditions, the relative standard deviation, adsorption capacity and limit of detection were 2.3 %, 80.0 mg g⁻¹ and 0.31 µg L⁻¹, respectively. The accuracy of the method was confirmed by analyzing the standard reference material (SRM 1640a) and spiked real samples.

Keywords: Dahlia-like adsorbent; Co(II) preconcentration; Flame atomic absorption spectrometry.

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