خلاصه:

هدف و ساختارهای فلزات نانو در اثر تغییرات فیزیکی و جوشکاری آبی زیان‌وار بوده و به این ترتیب می‌تواند به‌عنوان یک مخاطب مشخص برای محققان مورد استفاده قرار گیرد. با انجام این تحقیق، می‌توان درک عمیق‌تری از تاثیرات فیزیکی و بیولوژیکی فلزات نانویی در ایجاد تغییرات فیزیکی و جوشکاری آبی ممکن است.

نتیجه‌گیری:

نتیجه‌گیری از این تحقیق نشان داد که فلزات نانویی در کنار اثرات فیزیکی و بیولوژیکی، تأثیرات بیولوژیکی نیز به‌وجود می‌آورند. این تأثیرات به‌عنوان یک مخاطب مشخص برای محققان مورد استفاده قرار گیرد.

واژگان کلیدی:

فلزات نانو، استخراج فلزات نانو، کامپیوتر دانشگاهی، بیولوژیکی، فیزیکی
Extraction of Lead and Cadmium from environmental water samples by solid phase extraction using the modified magnetic nanoparticles prior to their determination by FAAS

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Abstract:

Background: Heavy metals can lead to the harmful effects to both animals and human beings by migrating through the food chain and accumulating in the body of organisms. Consequently, it was significant to develop the effective method for the removal and determination of the trace heavy metals in environmental and biological samples. This study aimed to present a sensitive and simple magnetic solid phase extraction procedure for the preconcentration of Lead and Cadmium ions in the environmental water samples.

Materials and Methods: The factors affecting the extraction of the target metal ions such as pH, the ionic strength, sample volume and amount of adsorbent were studied and optimized. Dithizone modified silica-coated magnetic Fe₃O₄ nanoparticles (H₂Dz-SCMNPs) were prepared and used for MSPE of trace amounts of Cr (III), Cu (II). The prepared magnetic nanoparticles were investigated by scanning electron microscopy (SEM), transmission electron microscopy (TEM), X-ray powder diffraction (XRD), Thermogravimetric analysis (TGA) and Fourier transform infrared spectroscopy (FT-IR).

Results: Under optimum conditions, calibration curve was linear in the range of 70ppb-20ppm of Pb with R²=0.999 and Pb was recovered (more than 99%) from the sample. Extraction efficiency is slightly lower for cadmium.

Conclusion: The proposed method showed some advantages to the former methods such as easy preparation of adsorbents, selectivity, precision, short times of pretreatment and high extraction yields, especially for lead. The proposed method was applied to natural and environmental water samples, which showed good agreement with reference method results.

Keywords: Cadmium, Lead, Environmental water sample, Solid phase extraction