

Karam Molaei, Hasan Bagheri, Ali Akbar
Asgharinezhad, Homeira Ebrahimzadeh, Mojtaba
Shamsipur



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SiO₂-coated magnetic graphene oxide modified with polypyrrole–polythiophene: A novel and efficient nanocomposite for solid phase extraction of trace amounts of heavy metals

Karam Molaei^a, Hasan Bagheri^{b*}, Ali Akbar Asgharinezhad^c, Homeira Ebrahimzadeh^c, Mojtaba Shamsipur^d

^a*Department of Chemistry, Tarbiat Modares University, Tehran, Iran*

^b*Chemical Injuries Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran*

^c*Faculty of Chemistry, Shahid Beheshti University, G.C., Evin, Tehran, Iran*

^d*Department of Chemistry, Razi University, Kermanshah, Iran*

h.bagheri82@gmail.com

h.bagheri@bmsu.ac.ir

*Corresponding author. Tel.: +98 21 8248256; Fax: +98 21 8248256.

ABSTRACT

The synthesis of a novel nanocomposite comprised of SiO₂-coated magnetic graphene oxide modified with a pyrrole-thiophene (mGO/SiO₂@coPPy-Th) copolymer is reported in the present work. The nanocomposite was applied for the fast magnetic solid phase extraction (MSPE) of trace levels of copper, lead, chromium, zinc and cadmium from water and agricultural samples. The nanocomposite was prepared in three steps: (1) decoration of graphene oxide sheets with magnetite nanoparticles thorough a facile one-step chemical reaction strategy; (2) chemical grafting by a silica layer to obtain high stability in acidic solutions; and (3) surface modification by coPPy-Th via simultaneous oxidation polymerization of pyrrole and thiophene in the presence of mGO/SiO₂ composite. The nanocomposite was subsequently characterized by transmission electron microscopy (TEM), scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FT-IR), X-ray powder diffraction (XRD) and vibrating sample magnetometry

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