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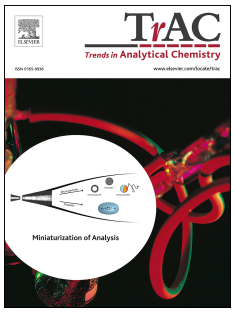

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Review of nanomaterials as sorbents in solid-phase extraction for environmental samples

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Abstract

Anthropogenic organic contaminants (AOCs) are found to exert significant impacts on the human ecosystem, at low or trace-level concentrations. To meet the demand for their quantitation in diverse environmental media, the use of preconcentration approaches (such as solid phase extraction) can help significantly upgrade both procedural efficiency and the sensitivity. Nanomaterials (NMs) are realized as excellent candidates for proper sorbents because of their unique structural and surface properties with noticeably enhanced sorption capability towards contaminants. This review explores the use of various NMs (metallic and mixed oxide nanoparticles (NPs), carbon NMs (fullerenes, carbon nanotubes, graphene, and graphene oxide), polymer-based nanocomposites (organic polymers, inorganic and hybrid polymers, molecularly imprinted polymers, and dendrimers), and silicon/magnetic NPs) as potential sorbents for analytical applications. In this review, the distinctive features of NM-based sorptive extraction techniques are examined comprehensively with the discussion on their future prospects and key challenges.

Keywords: Nanomaterials; Sample preparation; Solid phase extraction; Microextraction; Organic pollutants

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