



Salam, M.A., Burk, R.

**Solid phase extraction of polyhalogenated pollutants from freshwater using chemically modified multi-walled carbon nanotubes and their determination by gas chromatography**

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<sup>a</sup> Chemistry Department, Faculty of Science, King Abdulaziz University, P.O. Box 80203, Jeddah 21589, Saudi Arabia

<sup>b</sup> Ottawa-Carleton Chemistry Institute, Department of Chemistry, Carleton University, Ottawa, ON, Canada

**Abstract**

This paper describes the application of pristine and chemically modified multi-walled carbon nanotubes (MWCNTs) as packing materials for the preconcentration and determination of various polyhalogenated organic pollutants, pentachlorophenol, 2,4,5-trichlorophenol, 3,3',4,4'-tetrachlorobiphenyl, and 2,2',5,5'-tetrabromobiphenyl from real water samples based on solid-phase extraction. MWCNTs were chemically modified by octadecyl amine and polyethylene glycol, separately, and the resulting nano materials were used as packing materials for solid phase extraction. Method development, applicability, and suitability of the above mentioned adsorbents for the solid phase extraction were studied. Method development showed great reproducibility and sensitivity, and low limits of detection within a considerable linear range. The regeneration and reusability of the SPE cartridges were studied using Rideau River (Ottawa, Canada) surface water samples and the results showed that cartridges could be used for three cycles of adsorption/desorption with no loss of efficiency. In general, the results suggested that modification of MWCNTs affords a novel class of adsorbents, which could be used for the SPE of various analytes from aqueous solutions with great efficiency, recovery, reproducibility, sensitivity, and precision, within a wide range of analyte concentrations. © 2009 Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim.

**Author Keywords**

Multi-walled carbon nanotubes; Polyhalogenated organic pollutants; Regeneration; Rideau River; Solid-phase extraction

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