

Microtrapping characteristics of single and multi-walled carbon nanotubes

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Abstract:

Carbon nanotubes (CNTs) possess some highly desirable sorbent characteristics, which make them attractive for a variety of applications including micro-scale preconcentration. The main advantage of CNTs is that they are non-porous, thus eliminating the mass transfer resistance related to diffusion into pore structures. Their high aspect ratio leads to large specific capacity, consequently they have the potential to be the next generation high performance sorbent. In this paper we present the microtrapping. The objective of this paper was to study the sorption of select organic compounds on single and multi-walled nanotubes either packed or self-assembled onto a micro-sorbent trap. The data show that the CNTs show highly favorable adsorption as well as desorption. The former is characterized by relatively large breakthrough volumes and isosteric heats of adsorption (ΔH_s , close to 64 kJ/mol). Similarly, rapid desorption from CNTs was demonstrated by narrow desorption bandwidth. The elimination of non-tubular carbons (NTC) from the CNT surface is important, as they reduce the performance of these sorbents. (C) 2008 Elsevier B.V. All rights reserved.

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