Environmental Engineering and Management Journal March/April 2009, Vol.8, No.2, 259-265
http://omicron.ch.tuiasi.ro/EEMJ/

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ADSORPTION OF N-HEXANE VAPORS ONTO NON-FUNCTIONALISED HYPERCROSSLINKED POLYMERS (HYPERSOL-MACRONET^{TM}) AND ACTIVATED CARBON: THERMODYNAMIC AND KINETIC STUDIES

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Abstract

The adsorption characteristics of n-hexane vapors from gaseous stream onto two types of hypercrosslinked polymeric resins (MN 202 and MN 250), and a bituminous granular activated carbon (AC 20) was investigated. The n-hexane influent concentration ranged from 2100 to 4500 ppm and the adsorption processes were performed at 30, 40 and 50°C. Thermodynamic potentials *ΔH, ΔS,* and *ΔG* and isosteric heats of adsorption were calculated from experiment performed at different temperatures (30-50°C), and at various surface loading. The isosteric heat of adsorption curves varied with the surface loading for each adsorbent indicating that the hypercrosslinked polymeric resins (MN 202 and MN 250) and granular activated carbon (AC 20) have an energetically heterogeneous surface. The negative values of *ΔH, ΔS,* and *ΔG*, for each adsorbent studied, indicate the exothermic, stable and spontaneous nature of the n-hexane vapors adsorption process. Experimental data were also fitted using two adsorption kinetics models (pseudo-first-order and pseudo-second order equations) at 4500 ppm and 40°C. The results showed that the adsorption process of n-hexane vapors onto MN 202, MN 250, and AC 20 followed the pseudo-second-order kinetics.

Key words: AC20, adsorption, hexane, kinetics, MN 202, MN 250, thermodynamics, VOCs

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