

عنوان مقاله:

Adsorption methodology: Synthesis of Nanostructured nitrogen-doped porous carbon adsorbents for perchloroethylene vapor adsorption

محل انتشار:

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خلاصه مقاله:

The perchloroethylene (PCE, tetrachloroethylene), as a representative of chlorinated ethylenes and volatile organic compounds (VOCs), can be easily transported and remain in the atmosphere due to its volatility and stability properties. As a result, there is a crucial need to reduce this pollution to the extent permitted by international standards. The concentration of PCE determined with Gas chromatography– mass spectrometry analyzer (GC-MS). Activated nanocarbons (ACs) doped with nitrogen functional groups were prepared using the walnut shell as a precursor to evaluate their adsorption capacity for PCE vapors. Several techniques, including scanning electron microscopy (SEM), N₂ adsorption-desorption, and the Fourier transforms infrared spectrometry (FTIR), were applied to characterize the physical-chemical properties of the ACs. It is found that the PCE adsorption considerably increased on the nitrogen-doped ACs (KNCWS) due to their structural and surface charge properties. By conducting kinetic study, the pseudo-first-order model matched well with experimental data that could indicate reversible adsorption of the PCE on heteroatom doped ACs. The sips model agreed well with the equilibrium adsorption of PCE on the nitrogen-doped ACs, and the maximum adsorption capacities for PCE reached ۱۶۶, ۲۸۵, and ۹۵ mg/g for KNCWS-۱۱, KNCWS-۲۱, and KNCWS-۳۱, respectively. Also, the concentration of PCE were online measured based on nitrogen-doped ACs as solid-phase extraction (SPE) by the GC-MS as analytical procedure. Therefore, the nitrogen-doped ACs .was good choices for the removal of PCE vapors

کلمات کلیدی:

Perchloroethylene, Adsorption procedure, Gas chromatography mass spectrometry, Porous Nano carbon, Nitrogen-doped adsorbent

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