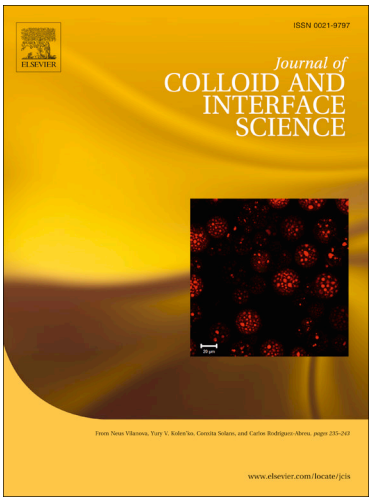

Rapid and tunable selective adsorption of dyes using thermally oxidized nanodiamond

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Rapid and tunable selective adsorption of dyes using thermally oxidized nanodiamond

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Abstract

In the present study, capability of nanodiamond (ND) for the adsorption of anionic (methyl orange, MO) and cationic (methylene blue, MB) dyes from aqueous solution was investigated. Employing fourier transform infrared (FTIR) spectroscopy, Boehm titration method and zeta potential, it was found that the simple thermal oxidation of ND at 425°C, increased the content of carboxylic acid of ND and accordingly the zeta potential of ND decreased considerably. Therefore, a series of oxidized NDs (OND) at various oxidation times and as-received untreated ND (UND) was used as adsorbents of MO and MB. The adsorption experiments exhibited that UND had large adsorption capacity, very fast adsorption kinetics and excellent selectivity for MO over MB. These results suggested that

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