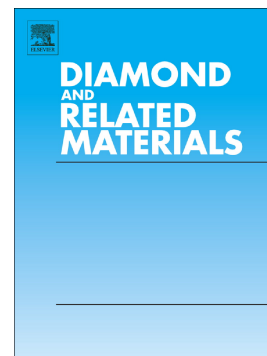


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Ion-Exchange Properties of High Pressure High Temperature Synthetic Diamond

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ABSTRACT

The adsorption and chromatographic properties of microparticulated diamond (1-2 μm and 4-6 μm fractions) from high pressure and high temperature synthesis (HPHT diamond) are investigated, with a focus on their cation-exchange capacity. Several adsorbents were prepared, either by wet oxidation of the surface of HPHT with $\text{H}_2\text{O}_2/\text{H}_2\text{SO}_4$ or $\text{HNO}_3/\text{H}_2\text{SO}_4$ mixtures, or by oxidation in air at 700°C , or following a four-step reduction using LiAlH_4 and *n*-butyllithium. The zeta-potential profiles as a function of pH and ion-exchange capacities were measured for the prepared adsorbents as well as isotherms of adsorption. The ion-exchange selectivity of oxidised HPHT diamond was studied towards alkali, alkaline-earth and transition metal cations.

Key Words: synthetic diamond; adsorption; metal cations; ion-exchange; liquid chromatography

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