

MODIFIED BIOMATERIAL SORBENTS AND PEAT FOR METALLOID AND PHOSPHOROUS REMOVAL

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Abstract

The present work investigates metalloid arsenic, antimony and tellurium as well as phosphorus sorption using iron oxohydroxides modified biomaterials (peat, straw, sawdust, moss, reed, and sand). The results were obtained using batch tests, and the sorption was studied as a function of initial metalloid concentration, pH and temperature. The optimal pH interval for the sorption of each studied element could be established and, for example, for Sb(III) is 6.5–9 and for Sb(V) – 3–6, while tellurium sorption using Fe-modified materials is favourable in a wider interval of 3–9. The impact of temperature on the metalloid and phosphorous sorption capacity of Fe-modified biomaterials was tested at four temperatures: 275 K, 283 K, 298 K, and 313 K. The sorption capacity increased with increase in temperature for all of the studied metalloids. The calculated thermodynamic parameters suggest that the sorption process is of a spontaneous nature and endothermic.

Keywords

Antimony, Arsenic, Biomaterial sorbents, Modification, Metalloids, Sorption, Tellurium, Phosphorous