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# Functionalized activated carbons for the removal of inorganic pollutants

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**ABSTRACT**

Activated carbon (AC) is an effective adsorbent for organic molecules but not for small and polar compounds, such as metals and oxyanions. This study presents preliminary results of a series of commercially prepared specifically modified activated carbons, aiming at removal of oxyanions and heavy metals. Breaktrough experiments were performed for chromate, arsenate, perchlorate and nickel, with concentrations between 700–9000 ppb. Complete removal of pollutants is observed for hundreds to thousands of bed volumes depending on the pollutant concentration. Exhausted columns with chromate were regenerated for reuse during at least seven cycles, and performance was slightly reduced (270 pore volumes at the 7th cycle, compared with 300 pore volumes at the 1st cycle). A pilot filtering device of 60 l was established in a metal plating factory, which has operated successfully for five months at least. A sorption kinetics experiment was performed at the pilot site, by adding a known amount of chromate and measuring reduction in its concentration with time. Measured results follow first order sorption kinetics, coinciding fully with theoretically evaluated rate constant, indicating complete removal.

*Keywords*: Adsorption; Activated carbon; Arsenic; Chromium; Nickel; Perchlorate; Breakthrough diagram; Sorption kinetics

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