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Fluoride removal with electro-activated alumina,

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**ABSTRACT:**

A new activation technique using alumina was developed for the removal of fluoride from water. This technique is based on an electro-activation by means of an electrical field. The optimum activation parameters (potential and contact time) were determined, and an activation time of about 120 min and a potential of + 100 m V/SCE were then selected. The effect of various experimental parameters - ionic strength, pH hardness, and fluoride-alumina concentration ratio ( $C_{Fo}/C_A$ )-was determined for the adsorption capacities of the electro-activated alumina. The effect of these parameters on the fluoride adsorption capacities of both electro-activated adsorbent and conventional alumina was essentially the same, except for the ionic strength parameter. Indeed, ionic strength did not have a considerable effect on the performance of the conventional alumina. However, for the electro-activated alumina, an increase in ionic strength induced a slight increase in the fluoride adsorption capacity of the electro-activated adsorbent. The optimum conditions, determined in the batch mode, gave an optimal pH ranging from 3.5 to 5 and a  $C_{Fo}/C_A$  ratio of about 4. At a NaCl concentration of 800 mg dm<sup>-3</sup>, the fluoride adsorption capacity of the electro-activated alumina was about 55% better than that of conventional alumina.