

## Decontamination of Chromium Containing Ground Water by Adsorption Using Chemically Modified Activated Carbon Fabric

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**Abstract :** Chromium in the environment is considered as one of the most toxic elements probably next only to mercury and arsenic. It is acutely toxic, mutagenic and carcinogenic in the environment. Chromium contamination of soil and underground water due to industrial activities is a very serious problem in several parts of India covering Karnataka, Tamil Nadu, Andhra Pradesh etc. Functionally modified Activated Carbon Fabrics (ACF) offer targeted chromium removal from drinking water and industrial effluents. Activated carbon fabric is a light weight adsorbing material with high surface area and low resistance to fluid flow. We have investigated surface modification of ACF using various acids in the laboratory through batch as well as through continuous flow column experiments with a view to develop the optimum conditions for chromium removal. Among the various acids investigated, phosphoric acid modified ACF gave best results with a removal efficiency of 95% under optimum conditions. Optimum pH was around 2 &ndash; 4 with 2 hours contact time. Continuous column experiments with an effective bed contact time (EBCT) of 5 minutes indicated that breakthrough occurred after 300 bed volumes. Adsorption data followed a Freundlich isotherm pattern. Nickel adsorbs preferentially and sulphate reduces chromium adsorption by 50%. The ACF could be regenerated up to 52.3% using 3 M NaOH under optimal conditions. The process is simple, economical, energy efficient and applicable to industrial effluents and drinking water.

**Keywords :** activated carbon fabric, hexavalent chromium, adsorption, drinking water

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