

# **Synthesis, Characterization and Arsenic Removal Effectiveness of Iron Oxide-Based Fibrous Adsorbents**

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## **Abstract**

Iron oxide-based adsorbents have been demonstrated to remove metals and organic compounds from water, which primarily depends on availability of iron oxide retained on material to contaminant in solution. Fibrous materials possess high specific surface area and surface functional groups which are essential factors in retaining iron sites on iron-oxide based adsorbents. Very little research has explored the possibility of using fibrous materials for developing iron oxide-based adsorbents which are expected to improve adsorption kinetics and increase adsorption capacity. We are investigating the potential of using fibrous materials to develop iron oxide-based fibrous materials and trying to understand the effect of different coating conditions on iron-retention capacity of these novel fibrous adsorbents and their effectiveness in arsenic removal from groundwater. To achieve these objectives, fibrous materials such as fiberglass, cellulose sponge, polypropylene and polyester fibers were characterized and iron oxide coating experiments, batch kinetic and equilibrium adsorption studies and column studies for arsenic removal were conducted. Initial results show the prospect of retaining iron oxide on these fibers and ability of these novel iron oxide-based fibrous adsorbents for arsenic removal from groundwater. Experiments pertinent to pretreatment of materials and optimization of coating conditions to achieve stronger bonding of iron oxide with materials surface are underway and are expected to improve iron binding strength of these fibrous materials.

**Keywords:** *Iron oxide-based adsorbents, Arsenic, Fibers, Iron oxide coating*