

INVESTIGATION OF MODIFIED PUMICE WITH HCL AND NAOH FOR REMOVAL OF FLUORIDE FROM AQUEOUS SOLUTION

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SUMMARY: If the fluoride concentration in drinking water exceeds standard levels, it can lead to various diseases such as osteoporosis, arthritis, brittle bones, cancer, infertility, brain damage, Alzheimer syndrome, and thyroid disorder. *Material and Methods:* In this work, modified pumice, with HCl and NaOH, was used for the removal of fluoride from aqueous solution. Several experimental parameters including pH (2–10), temperature (20–60°C), adsorbent mass (2–10 g/L), initial fluoride concentration (5–20 mg/L), and contact time were studied. All the experiments were conducted in a batch system with one parameter being kept constant while the others were changed. *Results:* The results showed that removal efficiency was increased with increases in contact time, initial fluoride concentration, and adsorbent dosage. A higher removal efficiency was observed at pH 6, 20°C solution temperature, 10 g/L adsorbent mass, 20 mg/L of fluoride concentration, and 90 min reaction time. A higher removal efficiency was also observed with adsorbents modified with HCl. The results show that modified pumice with HCl at 90 min contact time, pH 6, 20°C, and 20 mg/L of fluoride concentration can remove 96% of fluoride. The results reveal that pumice is an adsorbent with a high capacity to remove fluoride. In addition, HCl modified pumice shows a higher sorption capacity.

Key words: Fluoride; Pumice; Adsorption.

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