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Functionalized PU Foam for Water Filtration

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Abstract : Polyurethane foam is functionalized with Sulfonic acid groups to remove lead ions (Pb2+) from drinking water through a action exchange process. The synthesis is based on addition polymerization of the -NCO groups of an isocyanine with the –OH groups of a polio to form the urethane. Toluene-diisocyanateis reacted with Polypropylene glycol to form a linear pre-polymer, which is further polymerized using a chain extender, N, N-bis(2-hydorxyethyl)-2-aminoethane-sulfonic acid (BES). BES acts as a functional group site to exchange Pb2+ ions. A set of experiments was designed to study the effect of various processing parameters on the performance of the synthesized foam. The maximum Pb2+ ion exchange capacity of the foam was found to be 47ppb/g from a 100ppb Pb2+ solution over a period of 60 minutes. A multistage batch filtration process increased the lead removal to 50-54ppb/3g of foam over a period of 90 minutes.

Keywords : adsorption, functionalized, ion exchange, polyurethane, sulfonic
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