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(54) Title: REUSABLE COMPOSITE FILTER MATERIAL AND METHODS FOR MAKING AND USING THE SAME FOR REMOVING AND DESTROYING MOLECULAR CONTAMINANTS FROM WATER



FIGURE 1

(57) Abstract: A specially functionalized composite filter material with a high specific surface area is used to adsorb PFAs from potable water. In a preferred embodiment, the base filter material is granular activated carbon (GAC), which is sequentially coated with a thin layer of polydopamine, a thin layer of partially oxidized iron, and a thin coating of octadecylamine. After PFAs are adsorbed onto the coated GAC particles, the PFAs are removed by a rinsing process, and remain in the rinse effluent. GAC particles are recovered and recoated as needed to restore their adsorptive capacity. The PFA-containing effluent is treated using photochemical processes to destroy the PFA molecules. The now PFA-free effluent can be disposed of as a non-hazardous material. The composite filter material works in systems ranging from small passive systems for personal use to large scale, high-flow-rate utility water treatment systems.

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