

Functionalized Nanofiber Membrane And Method Of Preparation Thereof

Application Number: 202111060593

Inventors: Dr. Jaspreet Kaur Randhawa, Manish Kumar

ABSTRACT

The present invention relates to functionalized nanofiber membranes and more particularly, to chemically functionalized nanofiber membranes useful for, inter alia, selective separation of heavy metals and dyes from wastewater. The present invention provides a α -Fe₂O₃-PAN nanofiber membrane which may be surface functionalized with calcium carbonate (CaCO₃) and cellulose triacetate (CTA) or may be thermally treated to provide a multimodal wastewater treatment platform.

KEY APPLICATION AREAS

- 1.Wastewater treatment and water purification.
- 2.Heavy metal removal from contaminated water.
- 3.Organic dye degradation and filtration.
- 4.Industrial wastewater remediation.
- 5.Drinking water remineralization.
- 6.Antibacterial water treatment membranes.

POTENTIAL USE

- 1.Removal of heavy metals (e.g., lead, copper) from industrial and municipal wastewater.
- 2.Degradation and filtration of organic dyes (e.g., methylene blue, methyl orange) from textile and dyeing effluents.
- 3.Multifunctional wastewater treatment, simultaneously removing heavy metals, dyes, and other contaminants.
- 4.Drinking water remineralization after contaminant removal.
- 5.Reusable filtration membranes for long-term, high-efficiency water purification.

6. Antibacterial water filtration to inhibit bacterial growth (e.g., *E. coli*) during water treatment.