

S2.2.1 Performance Evaluation of Electrospun CAC-PS Filter for Separation of Oil-Water Mixtures

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Non-woven, electrospun filter media are among the most popular filter media for solid-liquid, solid-gas, liquid-gas and also liquid-liquid separations. Electrospun filter media comprise a large network of micro-/nanoscale fibers, with very small, inter-connected, micro-size pores in between the fibers. The very small diameters of the fibers and the interconnectivity of the pores lead to a high surface area-to-volume ratio and more available active sites. Therefore, electrospun filter media have higher filtration efficiency, as compared to their traditional counterparts. In this work, the separation of oil-water mixtures by electrospun filter media, comprising hybrid membranes of cellulose acetate (CAC) and polystyrene (PS) fibers was investigated. The electrospun, hybrid membranes were treated with commercially available surfactants and had various surface wettability, leading to a hydrophobic-oleophilic, a hydrophilic-oleophobic and a hydrophobic-oleophobic filter medium. These filter media were novel with respect to their material, structural topography and morphology, surface roughness and filtration performance. The oil-water mixtures were dispersions of pure C8 – C16 hydrocarbons and high purity water, at various ratios. High selectivity, high separation efficiency (> 90%) and low pressure drop was observed for the filter media. In these terms, the filter media were able to compete with conventional filter media.

