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## Functionalized polyethersulfone nanofibrous membranes with ultra-high adsorption capacity for organic dyes by one-step electrospinning

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**Abstract:** The adsorbents with high adsorption capacity are in urgent demand for water treatment because of the global freshwater crisis. In this work, the copolymer of acrylic acid and methyl methacrylate was synthesized at first, and subsequently blended with polyethersulfone (PES) with different mass ratios to prepare functionalized PES nanofibrous membranes via one-step electrospinning method. Benefiting from the abundant carboxyl groups, as well as the large specific surface area and high porosity, the nanofibrous membranes exhibited a maximum adsorption capacity of 2257.88 mg g<sup>-1</sup> for methylene blue (MB) dyes, which was among the largest adsorption amount of those previously reported adsorbents. In addition, the adsorption process was systematically investigated under various conditions, including pH, initial MB concentrations and contact time. Meanwhile, the pseudo-second-order model and Langmuir isotherm model was very suitable to describe the adsorption kinetics and isotherm, respectively. Moreover, the nanofibrous membranes also exhibited excellent recyclability (81.45% after 5 cycles), high filtration-purification efficiency (above 99%, at a high flux of 100 mL min<sup>-1</sup>) and selective adsorption and separation abilities. These excellent performances endow the nanofibrous membranes with promising potential applications for dye wastewater treatment.

**Keywords:** Electrospinning, Polyethersulfone, Nanofibrous membranes, Adsorption, Dye

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