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Synthesis of graphene from rice husk and its application as desalination membrane

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Graphene oxide (GO) is capable of filtering contaminants from seawater using nanoscale pores. The desalination membranes were formed from the folded layers of graphene oxide, which were obtained from rice husk by carbonization followed by activation using potassium hydroxide. The fabricated GO were studied using Raman spectroscopy and electron microscopy. Polyvinylidenfluoride (PVDF) membranes and porous stainless steel 316 respectively, with average pore sizes of 0.2 µm and 3-5 µm were used as supporting carrier layers for the production of GO membranes. The PVDF membrane was placed on the 1 mm thick porous SS316. All solutions were prepared using deionized water. We used chemical pure NaCl (35 g/l) for the preparation of seawater. The GO powders were dispersed in water and sonicated for 2 hours. Then, a 40 ml GO suspension (0.01 mg/ml) was filtered through a PVDF membrane (filtering area 4.5 cm²) at 550 Torr at room temperature, forming the GO membrane consisting of a thin GO layer on the PVDF membrane. Structural and x-ray phase analyzes of GO membrane were studied using an electron microscope and the DRON-4 diffractometer. The resulting membrane has pores sizes from 8 to 50 nm, which can be used to filter out small particles, organic molecules, and even common salts.

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