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Dual-layered nanocomposite membrane incorporating graphene oxide and halloysite nanotube for high osmotic power density and fouling resistance

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Abstract

This study introduces a thin-film composite (TFC) membrane with a dual-layered nanocomposite substrate synthesized using a dual-blade casting approach for application in osmotic power generation by the pressure-retarded osmosis (PRO) process. The approach incorporates halloysite nanotubes (HNTs) into the bottom polymer substrate layer and graphene oxide (GO) on the top layer substrate, on which a thin polyamide active layer is formed. The fabricated membrane substrate showed highly desirable membrane substrate properties such as a high porosity, opened-bottom surface, suitable top-skin surface morphology for subsequent active