

Role of PEBAX 1657 On TFC Membranes for Biogas Separation: Biomethane Purification for Sustainable Energy

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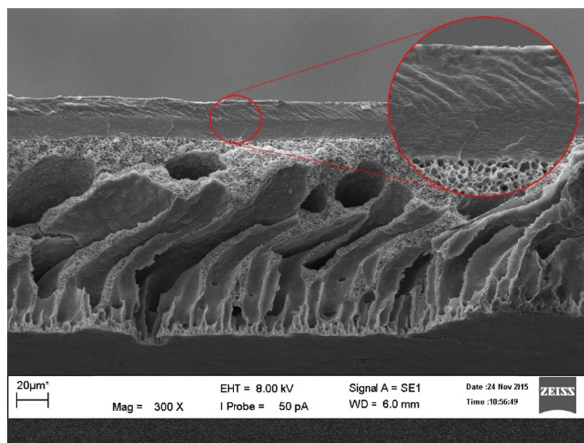
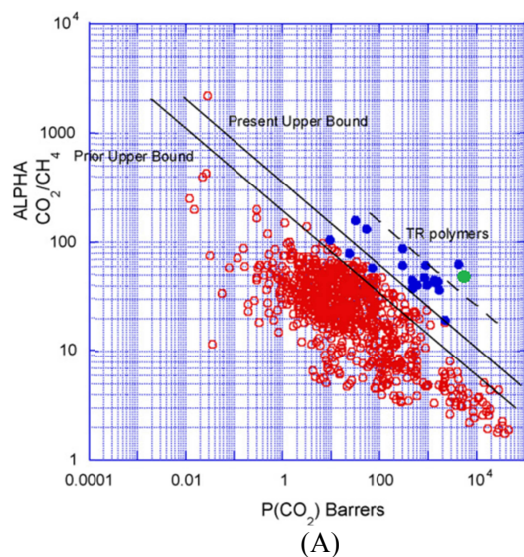
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ABSTRACT

Biogas is an alternative energy from biomass. The gas can be produced by the anaerobic digestion by microorganism. Biomass such as animal manure, kitchen waste, garden waste, or even human excreta are among the major source of biogas. 60% of methane along with 40% of carbon dioxide contain in biogas. Beside its important role in natural gas, methane also contributes to greenhouse gases. Their presence in atmosphere will thicken earth blanket and further lead to climate change. One pound of methane traps 25 times more heat in the atmosphere compared to one pound of carbon dioxide. This research introduced a new material, Pebax 1657 to improved current polymeric based membranes in form of thin film composite, TFC for a low cost biogas separation. PVDF was used as a porous support layer for this TFC and this combination have surpassed the Robeson 2008 trade off limit with CO_2 pressure normalize flux and selectivity of 5093 barrer and 52.50 respectively. Beside transforming the waste into wealth, the emission of this greenhouse gases can be reduced.

Keywords: PEBAX; PVDF; composite membrane; coating method; CO_2/CH_4 separation



(B)

Fig. 1. A) Robeson plot of various known polymeric membranes. Symbols represent: (○) various known polymeric membranes since 1991, (●) thermally rearranged polymer (●) this work -PVDF/Pebax 1657 TFC. B) SEM image of PVDF/Pebax TFC.