

PVDF/PVC BLEND MEMBRANE FOR CO₂/CH₄ SEPARATION

Bipradeep Maity ^{a,b} and Sunarti Binti Abdul Rahman ^{a*}

^a Faculty of Chemical & Natural Resources Engineering,
Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang,
Pahang, MALAYSIA.

^b SRM University, SRM Nagar, Kattankulathur,
Kancheepuram District, 603203, Chennai, Tamil Nadu, INDIA.
sunarti@ump.edu.my

Abstract

Methane gas is one of the most prevalent gaseous in the air yet it still has its benefits. Global methane emissions from landfill are estimated to be between 30 and 70 million tonnes each year. Most of this landfill methane currently comes from developed countries, where the levels of waste tend to be highest. In this study, a PVDF/PVC membrane was produced in order to separate CH₄ gas from the CH₄/CO₂ mixture. The PVDF/PVC membrane is produced by the combination of Polyvinyl Chloride (PVC), Polyvinylidene Fluoride (PVDF) and Dimethyl formamide (DMF) via dry/wet phase inversion technique. The invention of this PVDF/PVC membrane is expected to improve the characteristics of the polymeric membrane which is the permeability, selectivity and the pore size. PVDF/PVC is introduced with ratio of DMF (solvent): PVDF: PVC 90:10:0, 90:0:10, 90:7:3 and 90:3:7 in order to achieve the desired selectivity and permeability of CH₄/CO₂ gas separation. From the performance view, the PVDF/PVC membrane with composition 3:7:90 are the most suitable to separate the two gases compared to the rest of the membranes respectively at 1 bar. This high-performance sample are proven by the SEM image of the surface morphology itself. The pore diameter range of 30µm – 35µm.

Keywords: Methane gas; Permeability; Selectivity; Gas Separation