

Membrane purification with landfill gas for vehicle fuels

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Non- CO₂ greenhouse gases have been issued. CH₄ is 21 times more harmful than CO₂ and has the 2nd largest contribution to global warming among 6 greenhouse gases. Biogas comprised of CO₂ : CH₄ = 0.4~5 : 0.6~0.5 (mole fractions) is emitted from landfill, anaerobic digestion of activated sludge, food wastes and animal wastes. It is well-known that, and thus, it should be reduced to delay global warming and recovered CH₄ to use as vehicle fuels. The purification has been carried out via three common technologies: absorption, adsorption and membrane separation to concentrate CH₄ from biogas and remove CO₂, H₂S and siloxane. Membrane purification technology has economically many advantages than the other processes in detail automatic operations, dry-condition running in winter, and easy scale-up. The objectives of these studies are to develop a hollow fiber membrane by dry-wet spinning and a membrane purification process for the vehicle fuel from landfill biogas. Properties of polyethersulfone hollow fiber membrane were observed selectivity of CO₂/CH₄ 46 and permeability of CO₂ 100GPU. CH₄ concentration and recovery were obtained 97%, 95% in 2-stage and 97%, 68% in 1-stage process, respectively.