

NOVEL APPLICATION OF GAS TRANSPORT PROPERTIES WITH CERAMIC MEMBRANE FOR VOC EMISSION AND LACTIC ACID ESTERIFICATION**Edidiong Okon**School of Engineering
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UNITED KINGDOM**ABSTRACT**

Ethyl lactate is an environmentally friendly solvent which is obtained from the esterification of lactic acid and ethanol generated from biomass through a fermentative process. Membrane separations have shown a lot of promise in numerous esterification processes including ethyl lactate and in the recovery of CO₂ emissions from flue gas. This arises due to its cost-effective separation approach. The membrane can also act as a catalyst. In this work, the investigation of gas transport through inorganic ceramic membrane was carried out at a gas pressure range of 0.10-1.00 bar and temperature of 373 K. The gases used for the permeation tests were: carbon dioxide (CO₂), nitrogen (N₂), helium (He) and argon (Ar). The gas permeance was found to initially decrease and remain relatively constant with respect to gauge pressure at 373 K indicating a transition to Knudsen flow mechanism of gas transport through the ceramic membrane. Scanning electron microscopy (SEM) coupled with energy dispersive x-ray analyser was used for the characterisation of the quality and chemical composition of the support. The SEM image of the support showed a dense surface after the dip-coating process indicating a defect-free support.

Keywords: Lactic acid, gas permeance, characterization, Ethyl lactates and transport mechanism.