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## Evaluation and characterization of composite mesoporous membrane for lactic acid and ethanol esterification

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This paper presents the characterization and evaluation of a silica membrane with 15 nm pore size. The silica membrane was coated once for the permeation analysis. Helium (He), nitrogen  $(N_2)$ , argon (Ar) and carbon dioxide  $(CO_2)$  were used for the permeation tests conducted at the feed pressure of 0.10–1.00 bar and at the temperature of 413 K. The gas flow rate showed an increase with respect to feed pressure indicating Knudsen flow as the dominant mechanism. The order of the gas flow rate with respect to the feed pressure drop was  $Ar>CO_2>He>N_2$ . The SEM/EDXA result of the membrane showed a defect-free surface. The surface area and pore size distribution of the silica membrane was analyzed using liquid nitrogen adsorption. The results obtained from the Brunauer-Emmett-Teller (BET) isotherm of the 1<sup>st</sup> and 2<sup>nd</sup> dip-coated membranes were 1.497 and 0.253 m<sup>2</sup>/g whereas the Barrette-Joyner-Halenda (BJH) curves of the membranes were 4.184 and 4.180 nm, respectively, corresponding to a mesoporous structure in the range of 2-50 nm. The BET isotherms of the silica membranes showed a type IV isotherm with hysteresis indicating a mesoporous layer. The BJH curve of the 2<sup>nd</sup> membrane showed a 4% reduction in pore diameter after the modification process.

## **Biography**

Edidiong Okon is a PhD Researcher in the Institute of Design Innovation and Sustainability, Robert Gordon University, Aberdeen, United Kingdom, having previously obtained Bachelor and Master of Science degrees in Applied Chemistry. She is currently working on "Esterification of Lactic acid with Ethanol using cation-exchange resins impregnated metallic membrane reactor". She has previously published and co-authored a number of academic papers in international journals. Her research interests are in the area of heterogeneous catalysis and metallic membrane reactor for ethyl lactate synthesis. She is a Member of various Professional bodies including Royal Society of Chemistry. She has also made several conference presentations in the United State of America and United Kingdom.

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