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OMICS Group International is a pioneer and leading science event organizer, which publishes around 400 open access journals and conducts over 300 Medical, Clinical, Engineering, Life Sciences, Pharma scientific conferences all over the globe annually with the support of more than 1000 scientific associations and 30,000 editorial board members and 3.5 million followers to its credit.

OMICS Group has organized 500 conferences, workshops and national symposiums across the major cities including San Francisco, Las Vegas, San Antonio, Omaha, Orlando, Raleigh, Santa Clara, Chicago, Philadelphia, Baltimore, United Kingdom, Valencia, Dubai, Beijing, Hyderabad, Bengaluru and Mumbai.

ROBERT GORDON UNIVERSITY ABERDEEN

Trial CO_2 extraction ceramic membrane with an integration of a CO_2 laser gas detector

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Outline

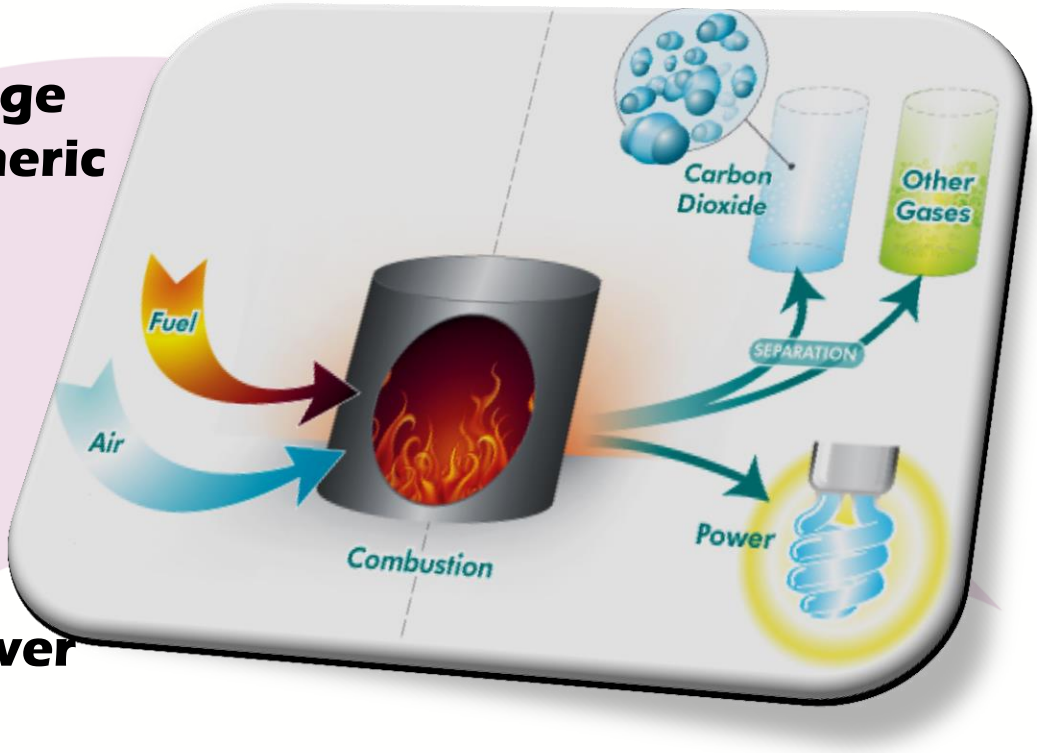
- Introduction
- Environmental Pollution
- Objectives
- Experimental
- Methodology
- Membrane characterization
- Results and Discussions
- Conclusion

Introduction

Environmental pollution

Coal-fired power plants as large point sources of CO_2 atmospheric emissions

- **Contaminates the environment with high concentration of pollutants.**
- **Flue gas from fossil fuel power plants emissions has been identified as the main contributor to global warming**



The objective

- To design a membrane-based system (silica modified) for the removal of CO_2 from flue gas stream.
- Detection of CO_2 concentration in gas mixtures by the use of CO_2 laser gas sensor.
- Determination of single gas permeance through the modified membrane.

Experimental

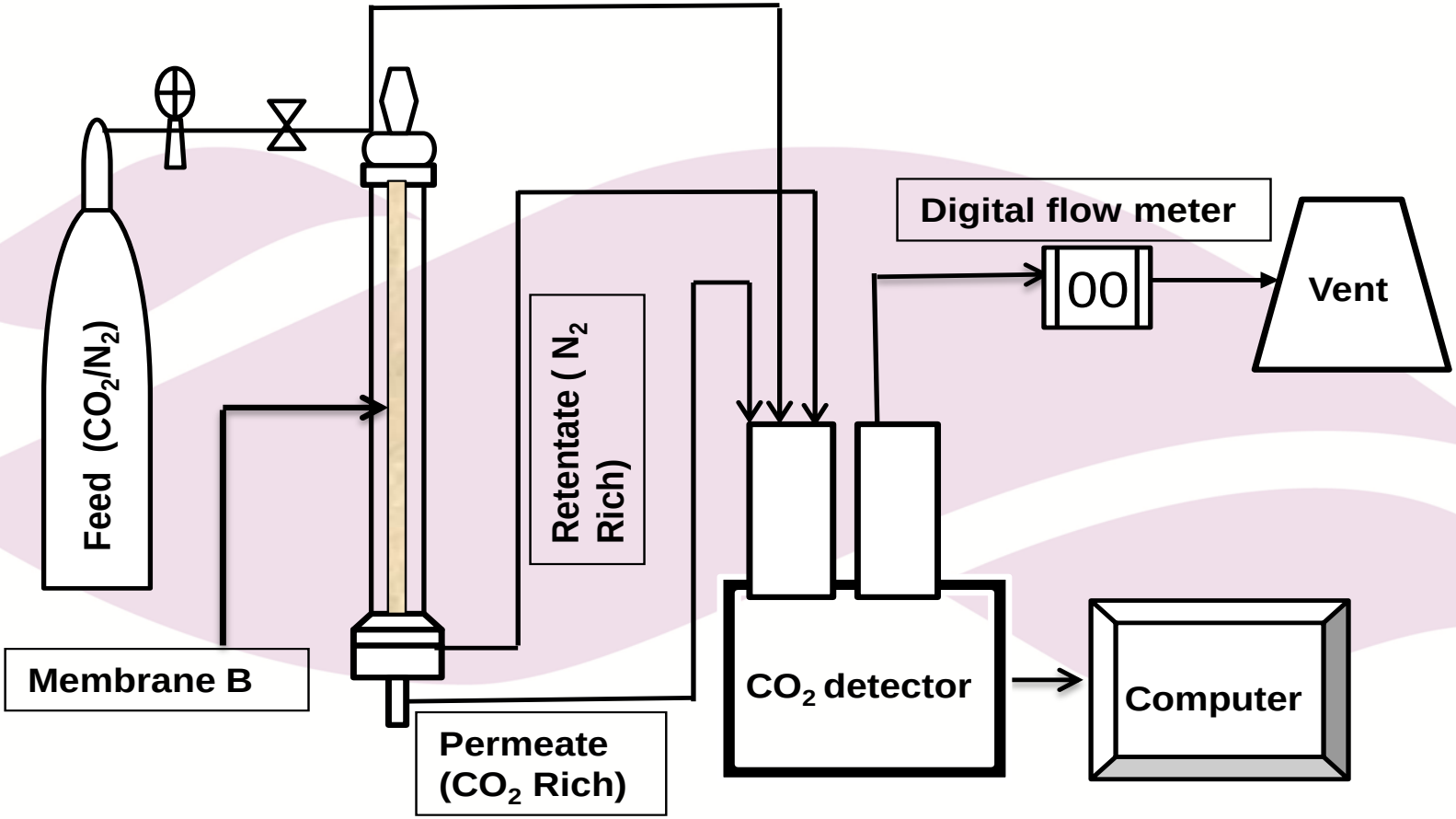


Fig. 1: Experimental set up of gas permeation

Methodology

Fig. 2: Fresh support

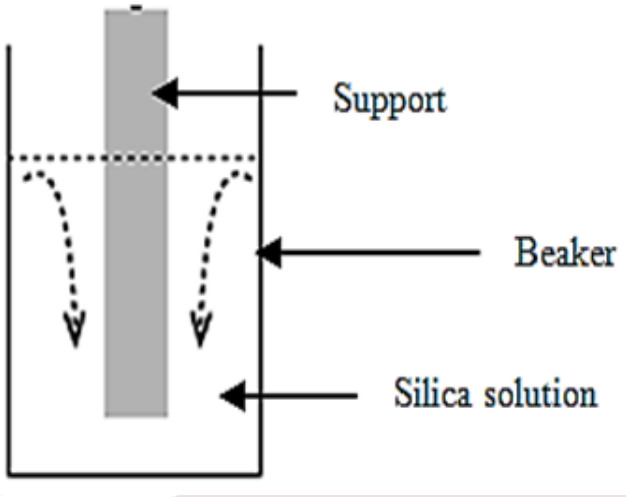


Fig. 3: Sequential dip-coating of the fresh support

Membrane Characterization

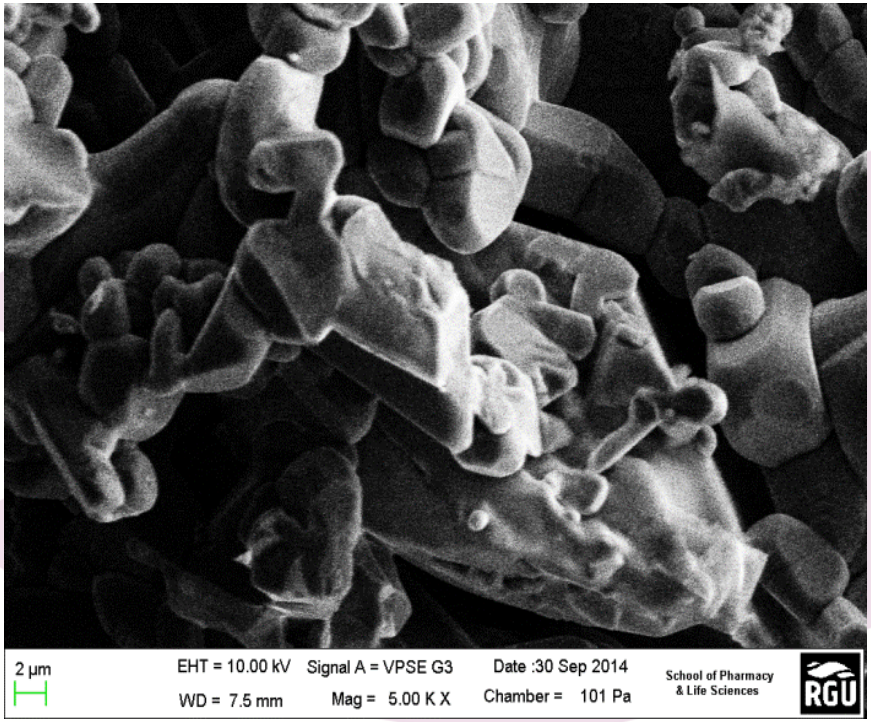


Fig.4: SEM Image of support before modification

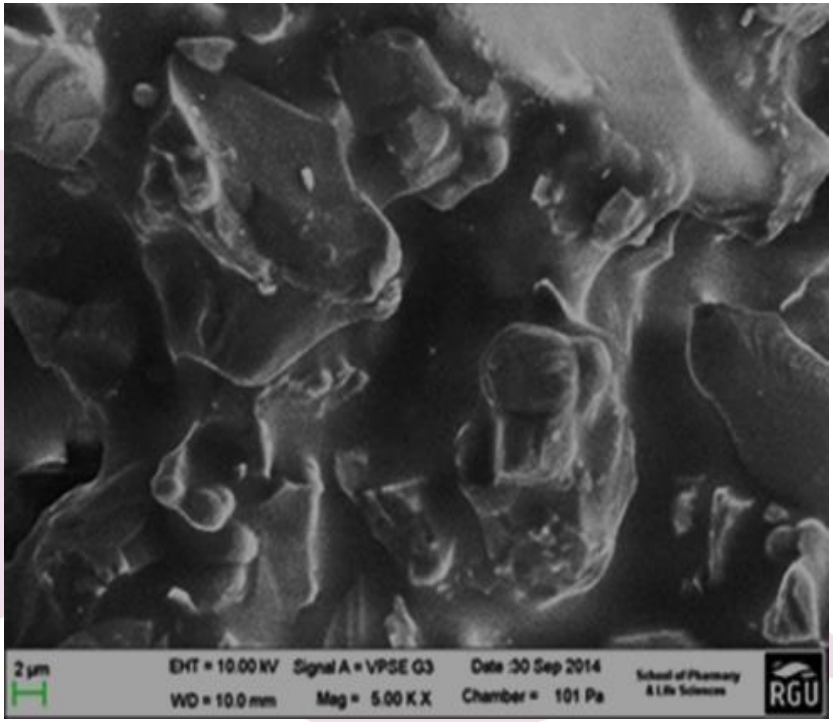


Fig. 5: SEM Image of support after modification

Results and Discussions

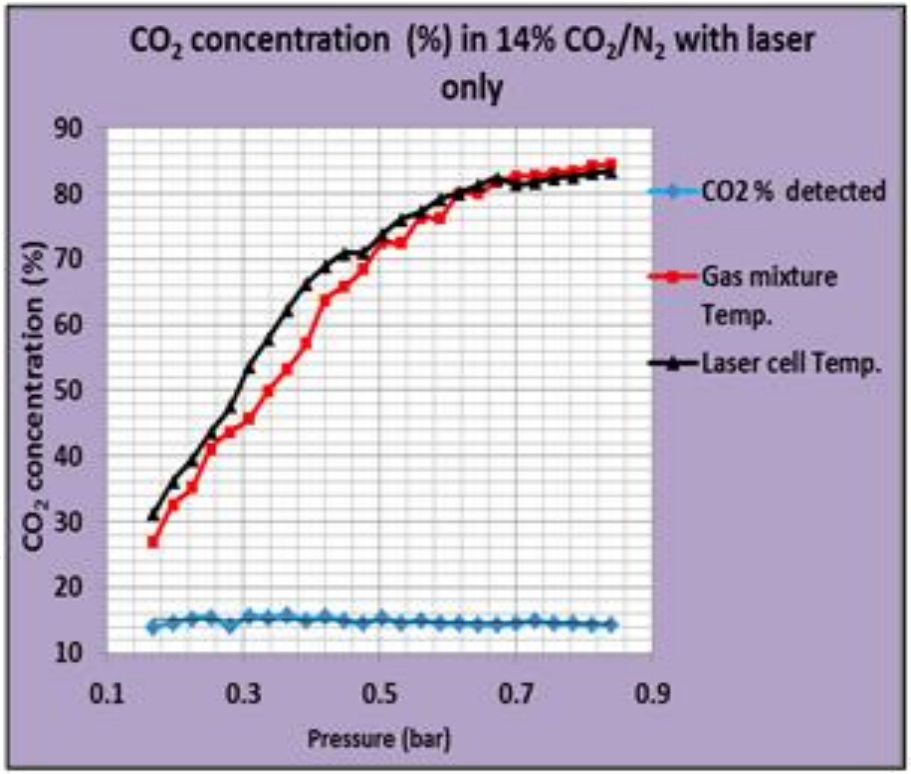


Fig 4: CO_2 percentage concentration detection with CO_2 laser gas sensor only

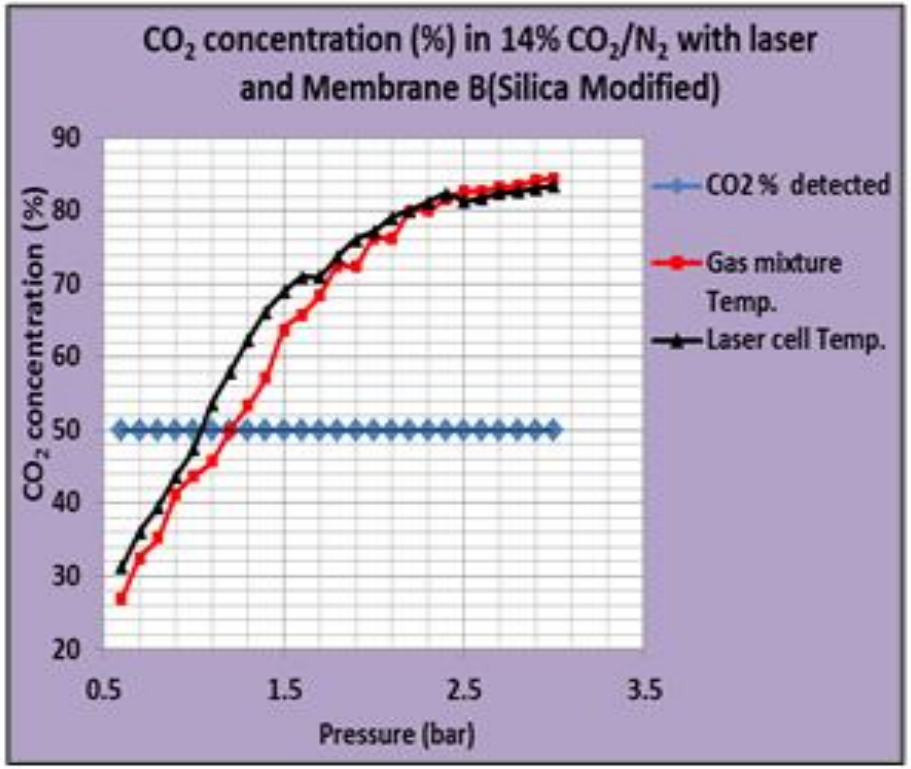


Fig 5: CO_2 percentage concentration detection through a modified membrane with integration of CO_2 laser gas sensor

Results and Discussions

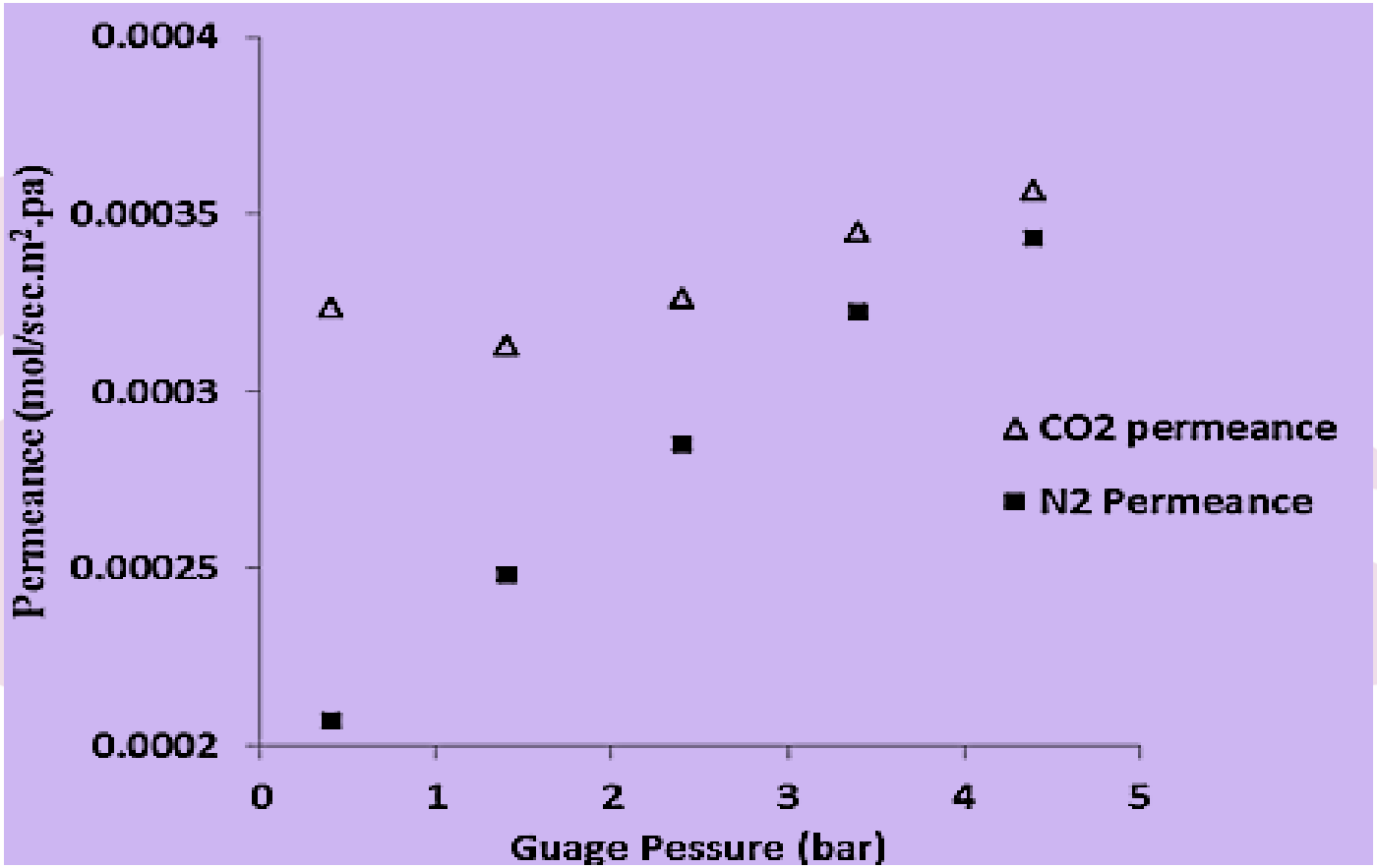


Fig. 6: Single gas permeance as a function of feed pressure at room temperature

Conclusion

- Fabrication of silica membrane on macro porous alumina supports.
- Binary gas permeation experiments were carried out to determine CO_2 concentration using a CO_2 laser gas sensor only and secondly when the laser was connected to the reactor housing a modified support
- Results obtained show an appreciable CO_2 extracted from the modified membrane with the integration of the CO_2 laser gas detector from 14% to 50% concentration.
- Single permeation experiments indicate that the permeation characteristics of the fabricated membrane are governed by surface adsorptive diffusion flow mechanism
- The experiment confirm the usefulness of the CO_2 laser gas detector in membrane performance optimization especially for application in flue gas separation processes

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