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Electronic Supplementary Information

Highly oriented improved SAPO 34 membrane on low cost support for hydrogen gas separation

Jugal Kishore Das, Nandini Das* and Sibdas Bandyopadhyay

Ceramic Membrane Division, Central Glass & Ceramic Research Institute, CSIR, 196 Raja S. C. Mullick Road, Jadavpur, Kolkata 700 032, India
E-mail: dasnandini@cgcri.res.in

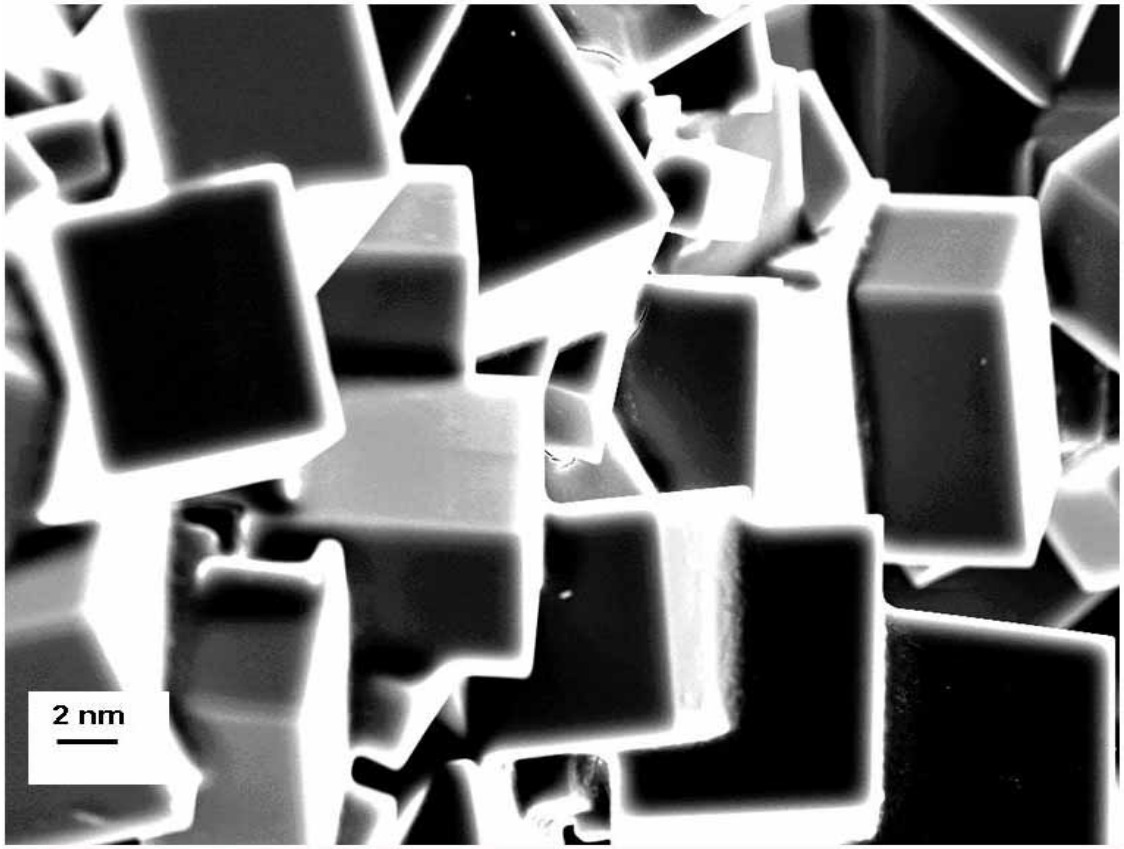

Fig. S1 SAPO 34 membrane layer prepared on the non-modified clay-Al_2O_3 support surface at 170 °C for 120 h by hydrothermal process for comparison.

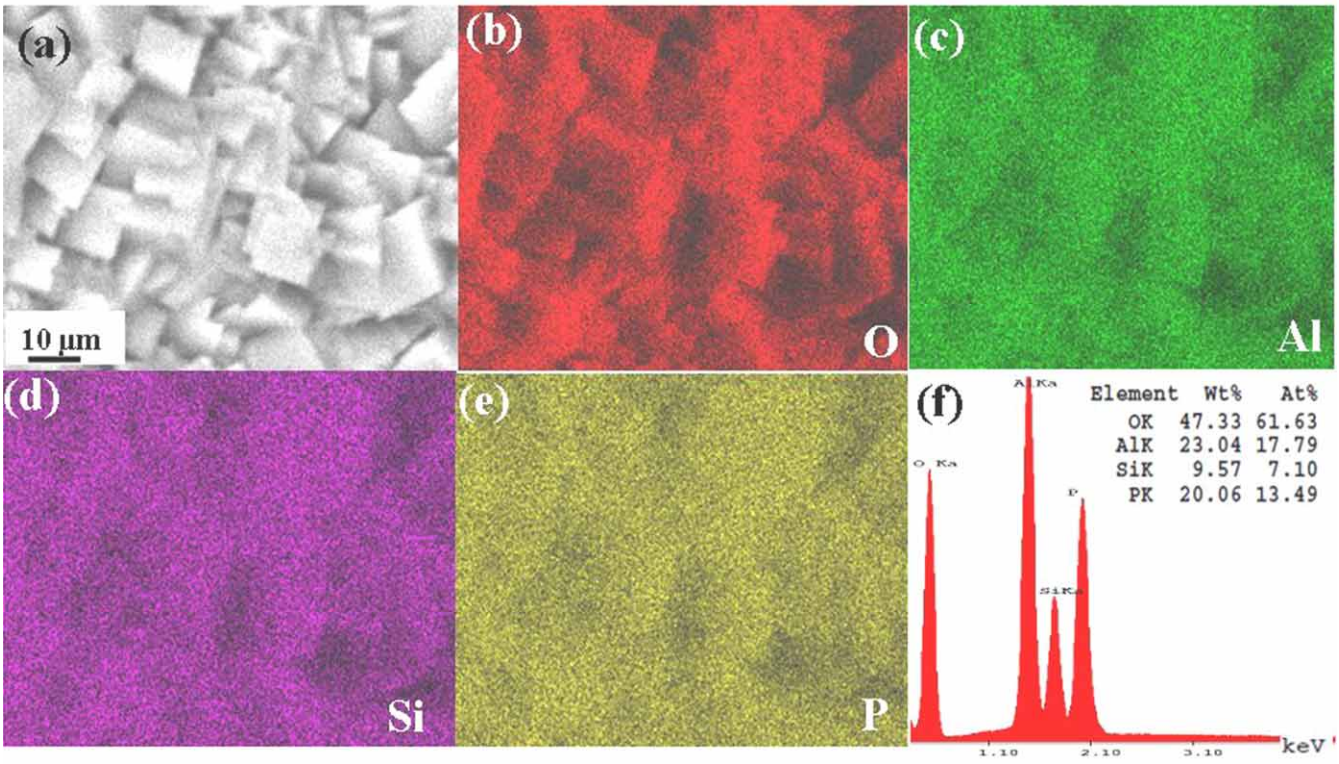

Fig. S2 (a) FESEM micrograph of SAPO 34 membrane layer on silica modified clay-Al_2O_3 support, (b-e) consequent elemental mapping (O, Al, Si and P) of the membrane layer and, (f) corresponding EDAX spectra of the membrane layer and the inserted table show the quantitative analysis.

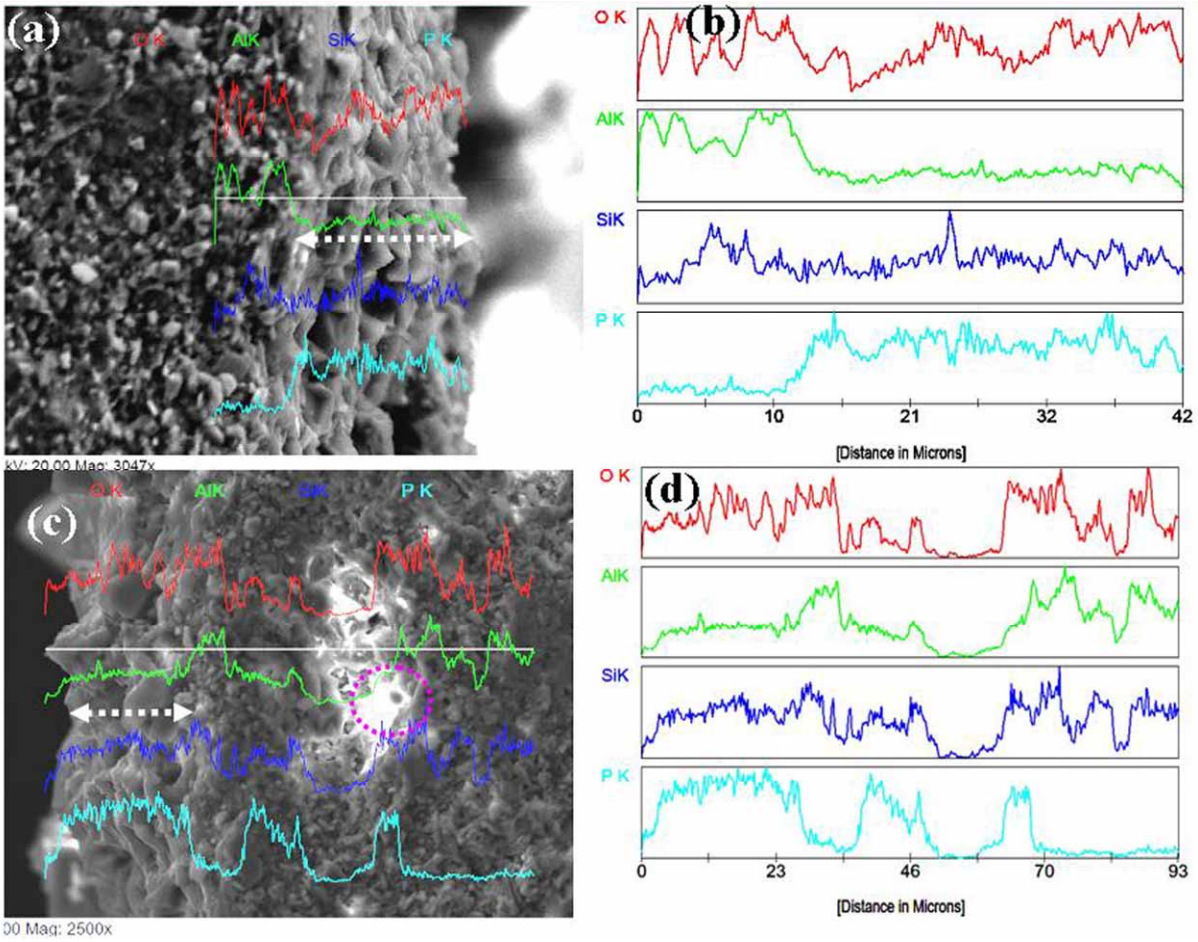

Fig. S3 (a) Cross section with line scanning view of the synthesized membrane on modified substrate, (b) the corresponding spectra of O, Al, Si, and P during the elemental scan (distance in micron), (c) cross section with line scanning view of the synthesized membrane on non-modified substrate and, (d) the corresponding spectra of O, Al, Si, and P during the elemental scan. (The white dotted arrow mark shows the SAPO 34 membrane layer on the modified and non-modified support.). The zeolite penetration inside the non-modified support was indicated by the dotted circle.

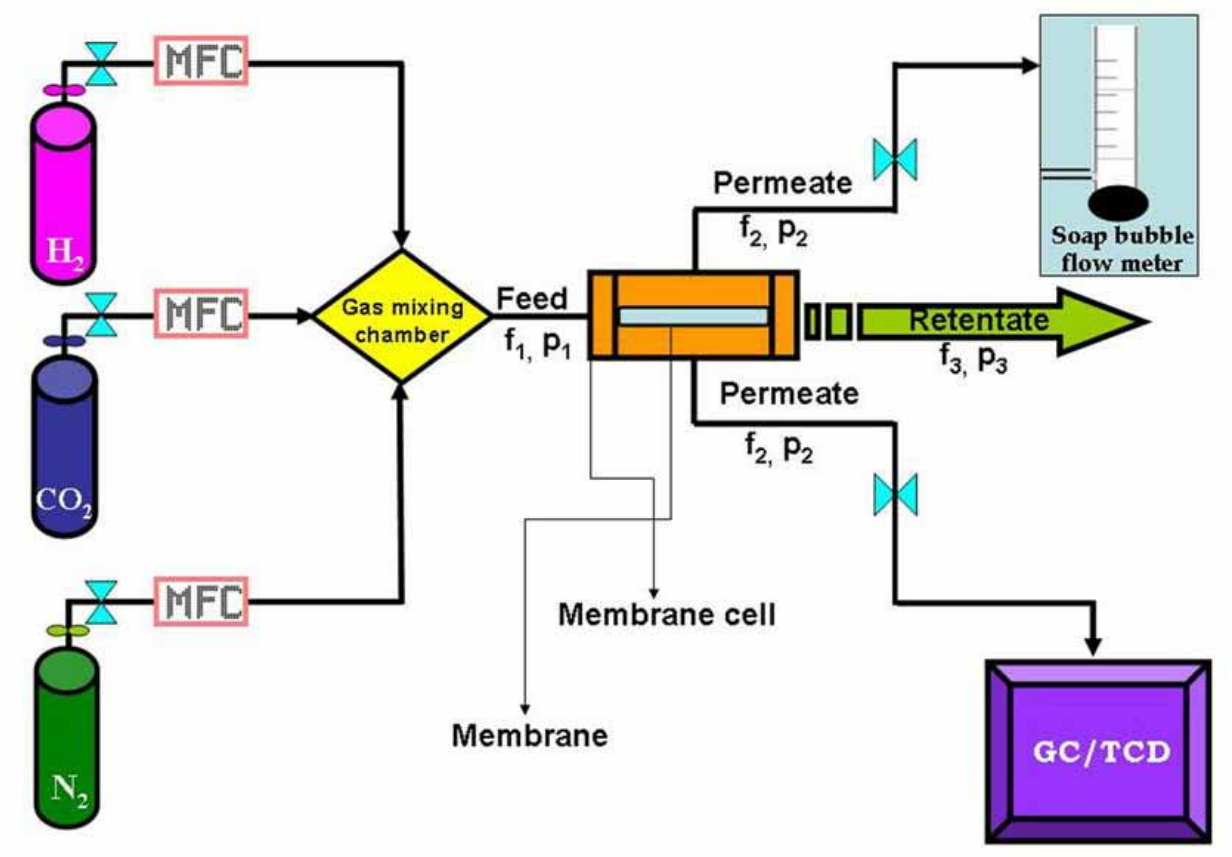

Fig. S4 Schematic representation of permeation apparatus for the measurement of both single gas and mixed gas permeation.

Legend:

GC: gas chromatography

TCD: thermal conductivity detector

f: volumetric flow rate

p: pressure

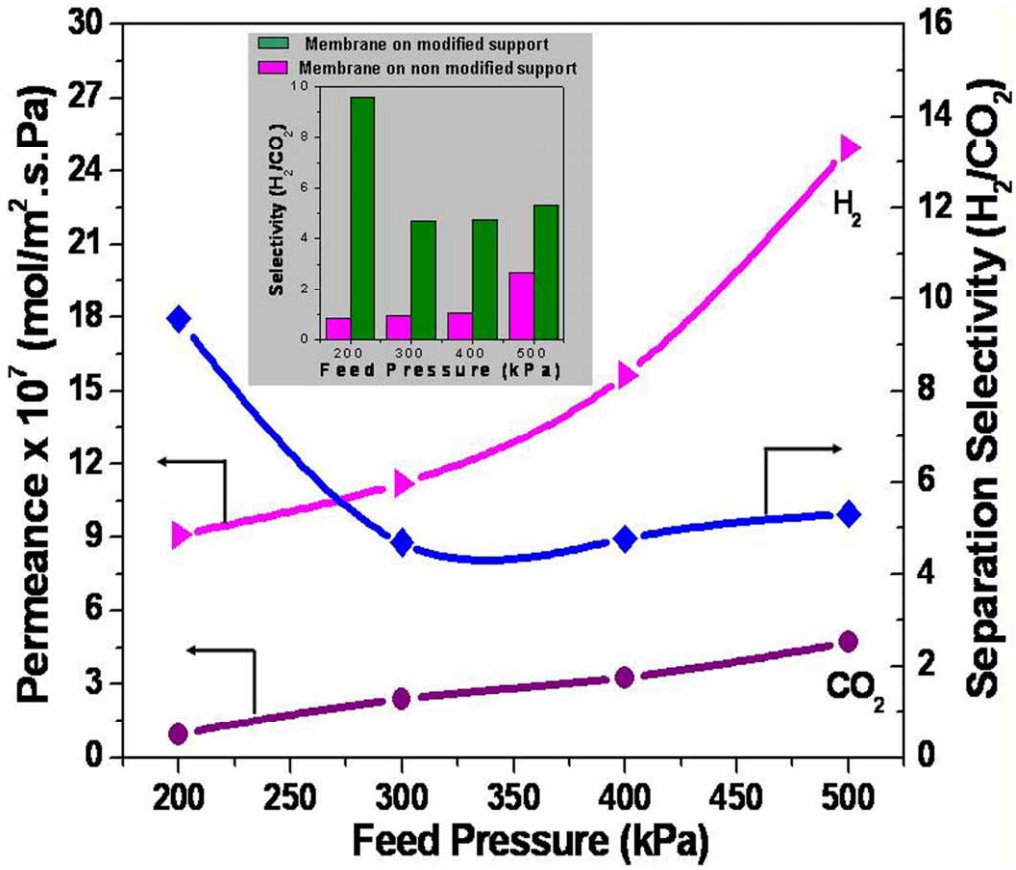

Fig. S5 Single gas permeation through SAPO 34 membrane at room temperature as a function of different feed pressures and separation selectivity of H_2/CO_2. The inset shows the comparison of separation selectivity of H_2/CO_2 by using SAPO 34 zeolite membrane prepared on the modified and non-modified support surface.