Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting information

High-performance carbon molecular sieve membranes for gas separation and solvents dewatering by pervaporation

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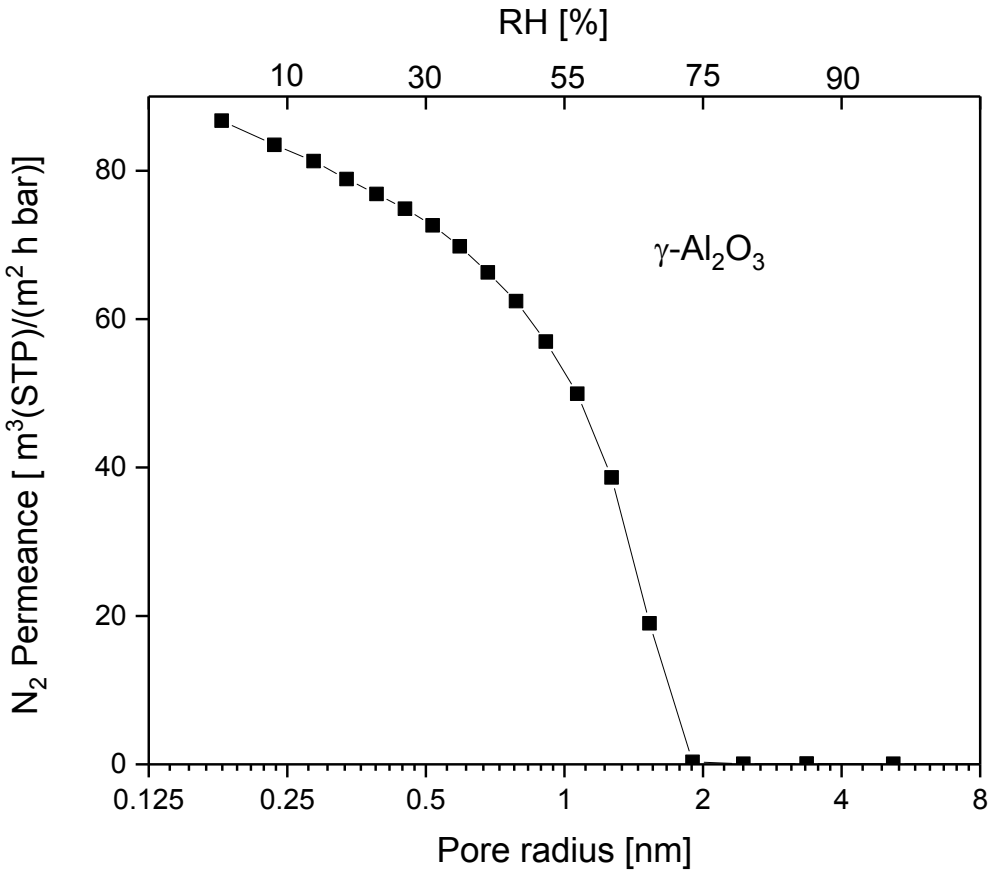

Fig. S1 N2- permeance from permporosimetry measurements with N_2/H_2O on a tubular α-Al2O3- support coated with two γ-Al_2O_3 layers.

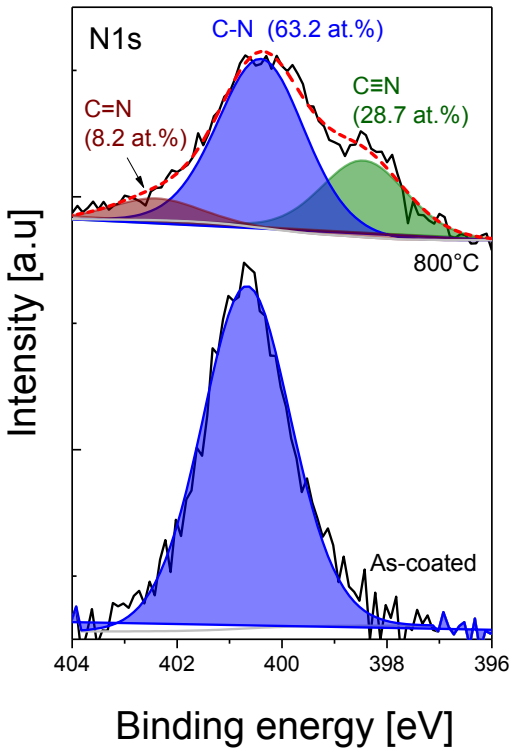

Fig. S2 N1s XPS spectra of the α-Al_2O_3/γ-Al_2O_3-supported polyimide membrane before (bottom graph) and after (top graph) the heat treatment at 700°C.

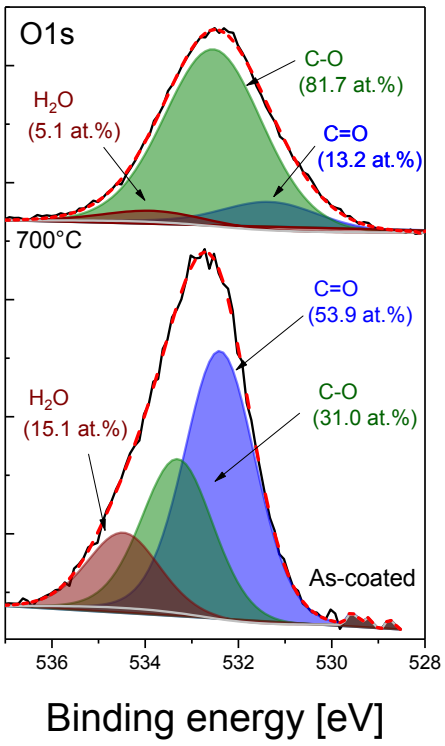

Fig. S3 O1s XPS spectra of the α-Al_2O_3 / γ-Al_2O_3-supported polyimide membrane prior (bottom graph) and after (top graph) pyrolysis at 700°C.

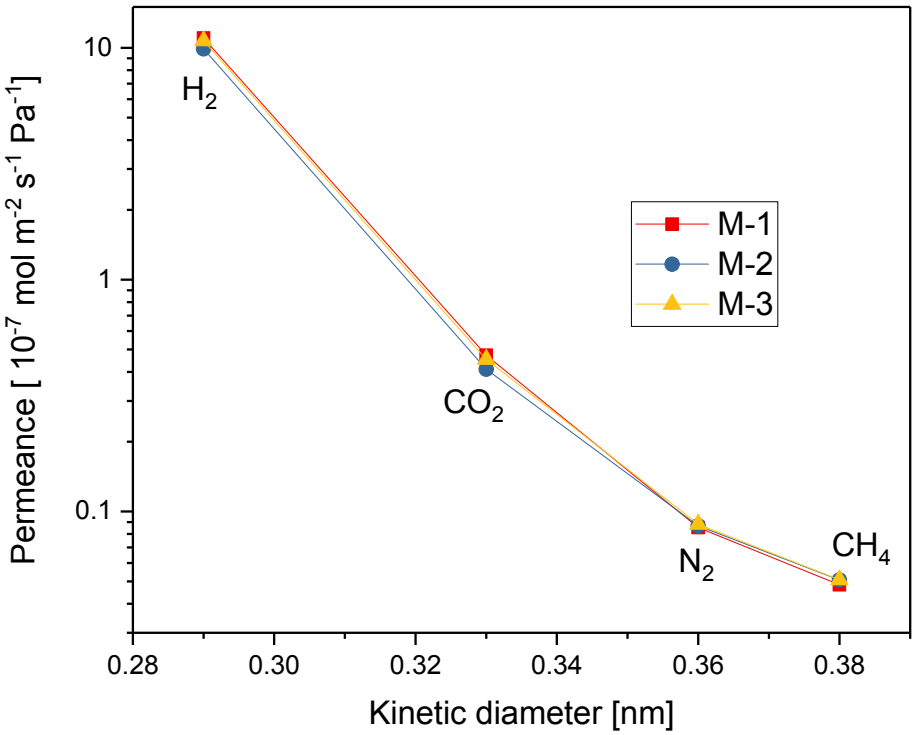

Fig. S4 Single gas permeation through α-Al_2O_3 / γ-Al_2O_3-supported CMS membranes produced within one batch tested at 200°C with a feed pressure of 2bar. Gas permeances are measured for three samples with error less than 5 %.

Table S1. Permselectivities of the α-Al_2O_3 / γ-Al_2O_3-supported CMS membranes

Permeance ratios	**M-1**	**M-2**	**M-3**	**Knudsen selectivity**
H_2/CO_2	23.30	24.06	23.65	4.67
H_2/N_2	129.70	113.94	121.44	3.73
H_2/CH_4	227.74	195.06	211	2.8

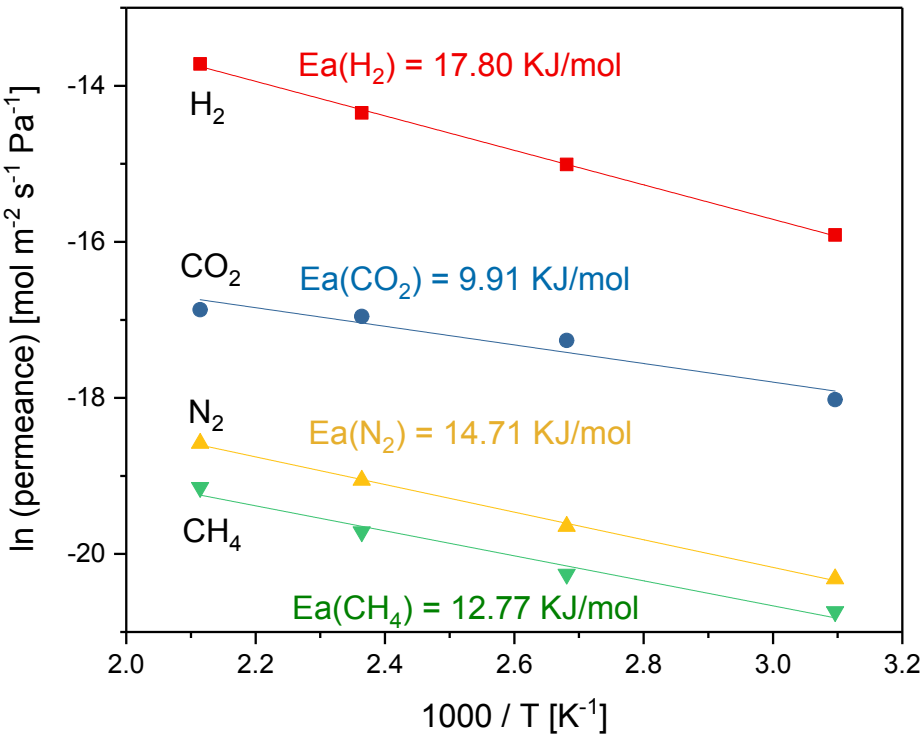

Fig. S5 Arrhenius plots for the permeance of H_2, CO_2, N_2 and CH_4 through the α-Al_2O_3 / γ-Al_2O_3 supported CMS membrane.