

## Supplementary information

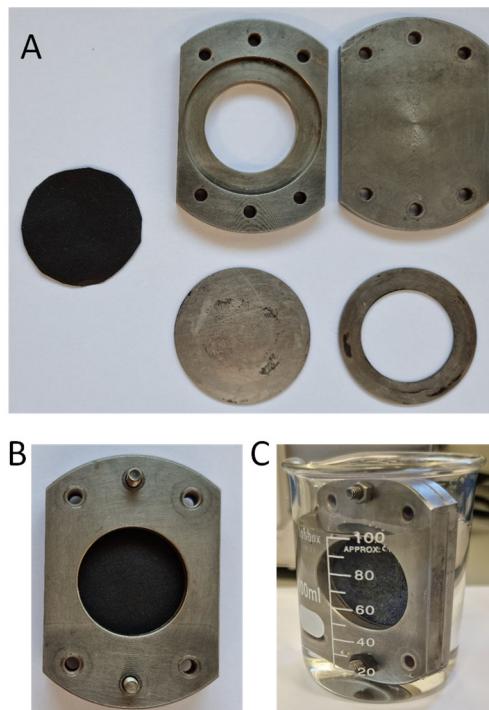
### Double layered Pebax® 3533/ZIF-8 membranes with single-walled carbon nanotubes buckypaper as support for gas separation

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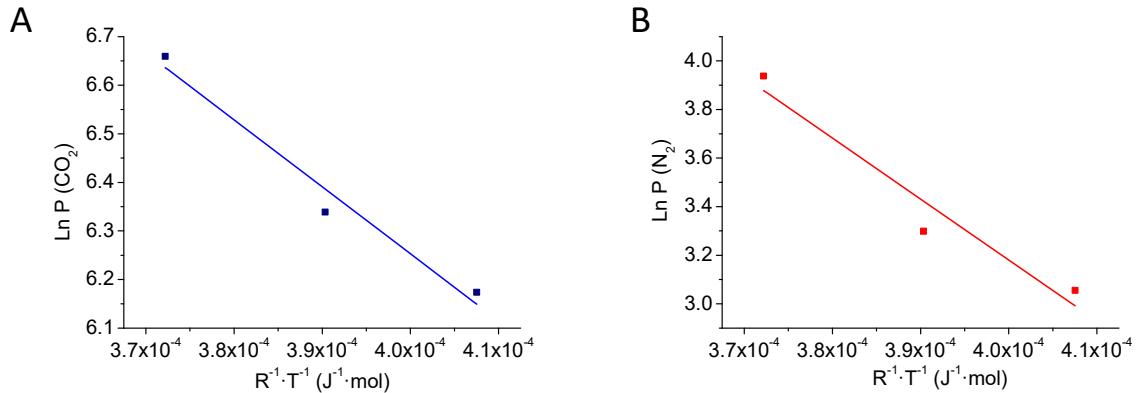
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*Figure S1.* Photographs of the experimental rig for the synthesis of the ZIF-8 layer on the SWCNT buckypaper (A). The buckypaper placed between the disc and the ring (B). ZIF-8 layer being synthesized on the buckypaper (C) at room temperature.



*Figure S2.* Arrhenius model linear fit for the calculation of the apparent activation energy of permeance in the Pebax®/ZIF-8/SWCNT-bp SC for  $\text{CO}_2$  (A) and  $\text{N}_2$  (B).  $R^2$  fitting parameter is 0.97 and 0.94, respectively for  $\text{CO}_2$  and  $\text{N}_2$ .

## Supplementary tables

*Table S1.* Gas permeation and selectivity results at 35 °C and 3 bar feed pressure.

Membrane	$\text{CO}_2$ Permeance (GPU)	$\text{CO}_2/\text{N}_2$ Selectivity
Dense Pebax® 3533	$2.4 \pm 1.8$	$21.0 \pm 2.1$
Pebax®/SWCNT-bp-PI	$73 \pm 9$	$14.7 \pm 3.1$
Pebax®/SWCNT-bp-SC	$161 \pm 12$	$18.3 \pm 3.5$
Pebax®/ZIF-8/SWCNT-bp-PI	$115 \pm 11$	$19.1 \pm 2.2$
Pebax®/ZIF-8/SWCNT-bp-SC	$566 \pm 23$	$20.9 \pm 4.2$

## Robeson upper bound adapted

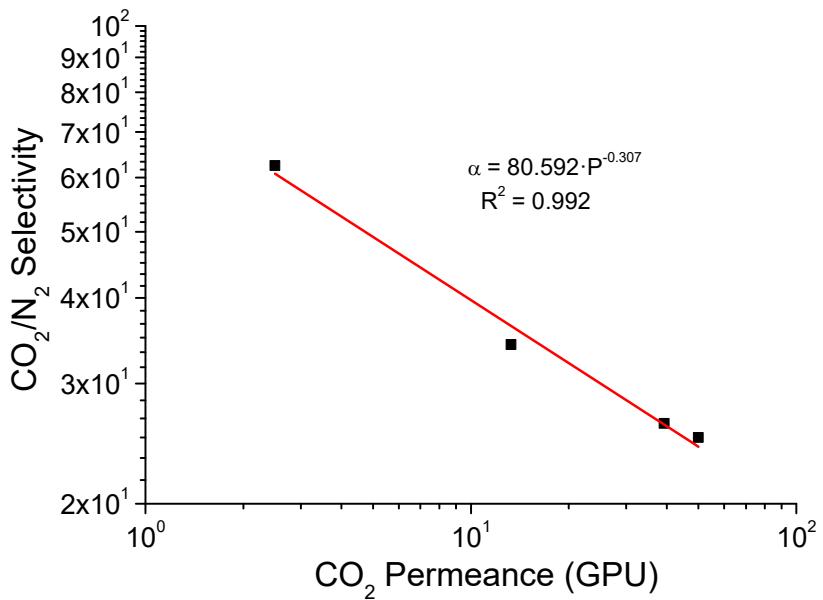


Figure S3.  $\text{CO}_2/\text{N}_2$  bound defined in GPU at  $35^\circ\text{C}$ , adapted from the data published in Robeson .[1]

## References

- [1] L.M. Robeson, The upper bound revisited, *J. Memb. Sci.* 320 (2008) 390–400.  
<https://doi.org/10.1016/j.memsci.2008.04.030>.