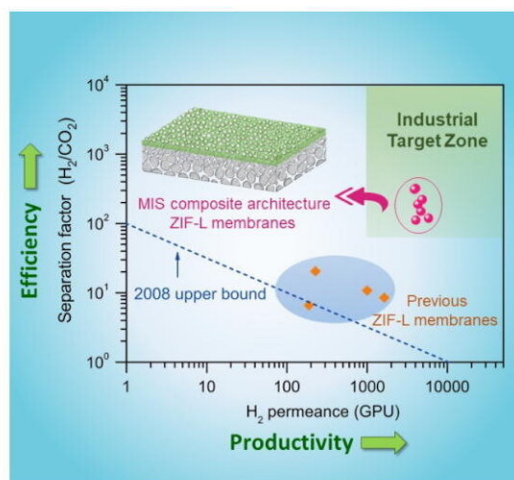


Zeolitic imidazolate framework-L membrane improves carbon dioxide separation efficiency

May 26 2021, by Li Yuan



Graphical abstract. Credit: *Science Bulletin* (2021). DOI: 10.1016/j.scib.2021.05.006

Metal-organic framework (MOF) membranes are promising for energy-efficient chemical separations. However, the microstructural design of these membranes remains challenging.

Recently, a research group led by Prof. Yang Weishen and Dr. Ban Yujie from the Dalian Institute of Chemical Physics (DICP) of the Chinese Academy of Sciences proposed a zeolitic imidazolate

framework (ZIF)-L [membrane](#) with a membrane-interlocked-support composite architecture for H₂/CO₂ separation.

The study was published in *Science Bulletin*.

The researchers completely confined the ZIF-L membrane into the voids of the alumina support through an interfacial assembly process, yielding membrane-interlocked-support (MIS) composite architecture. It presented apparent-zero-thickness, oriented membrane layer and strengthened crystal boundaries, which contributed to high permeance and high selectivity.

The membranes showed average H₂ permeance of above 4000 GPU and H₂/CO₂ separation factor (SF) of above 200, falling into the industrial target zone.

Furthermore, the ZIF-L membrane showed mechanical stability, scraped repeatedly by a piece of silicon rubber causing no selectivity loss.

Previously, the group collaborated with Prof. LI Weixue from University of Science and Technology of China to identify the anisotropic mass transfer rate through the two kinds of channels of ZIF-L by means of molecular dynamics simulations, providing preliminary guidance for this study.

More information: Kun Yang et al, ZIF-L membrane with a membrane-interlocked-support composite architecture for H₂/CO₂ separation, *Science Bulletin* (2021). [DOI: 10.1016/j.scib.2021.05.006](https://doi.org/10.1016/j.scib.2021.05.006)

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