Hetero-lattice intergrown MOF membranes: A potential solution to polyol upgrading in industry

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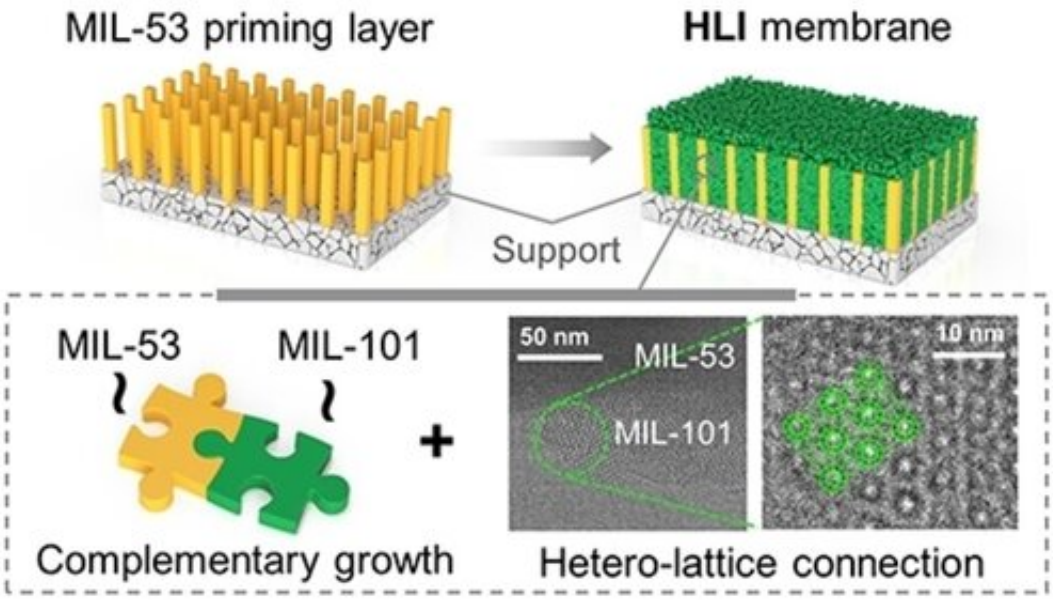

Graphical abstract. Credit: DOI: 10.1002/anie.202114479

Metal-organic frameworks (MOFs) bring tremendous opportunities for separation of liquid chemicals using membranes.

However, due to the lack of highly compact and robust micro-architecture to cope with complicated and tough separation situations, MOF membranes available for liquid chemical upgrading through pervaporation are rare.

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 (CAS) proposed hetero-lattice intergrown (HLI) and robust MOF membranes for polyol upgrading in industry.

This study was published in *Angewandte Chemie International Edition* on Dec. 22.

The researchers synthesized HLI membranes, with the integration of two distinct network MOFs, namely MIL-53 (Al) and amino-MIL-101 (Cr), at molecular scale.

They demonstrated that the highly compact and robust micro-architecture was contributed to the complementary growth, concomitant with the strong connection between these two lattices.

The HLI membrane with ultra-stability showed excellent pervaporation dehydration performances for C2-C4 polyol solutions. Furthermore, polymer-grade ethanediol (99.93%) through HLI membranes could be obtained, saving ca. 32% of energy consumption relative to the traditional vacuum distillation.

"These results spotlight the potential of MOF membranes to create more solutions for current separation challenges," said Prof. Yang.

More information: Yuecheng Wang et al, Hetero-Lattice Intergrown and Robust MOF Membranes for Polyol Upgrading, *Angewandte Chemie International Edition* (2021). DOI: 10.1002/anie.202114479

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