Scientific Achievement

Fabrication of high-performance ZIF membranes by a new all-vapor-phase (LIPS) method based on atomic layer deposition (ALD) and ligand-vapor treatment.

Significance and Impact

The LIPS process establishes a reliable, scalable, and robust approach for the fabrication of ZIF and MOF membranes and nanocomposites.

Research Details

– ALD of ZnO in a porous support results in an impermeable composite. After ligand-vapor (2-methylimidazole) treatment, ZnO is partially transformed to ZIF, creating a nanocomposite membrane with high propylene flux and high propylene/propane selectivity.
– The high separation performance is attributed mostly to a not well-crystallized ZIF-like deposit.


Work was performed at University of Minnesota.