Direct Spraying Approach for Synthesis of ZIF-7 Membranes by Electrospray deposition

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ZIFs are promising materials for advanced membrane applications due to their desirable properties, which enable them to recognize specific target molecules based on molecular sieving mechanism and/or adsorption affinity. However, their large scale commercial applications still remain challenge because of the absence of a synthesis method that offers reproducibility, scalability, and cost-effectiveness. To this end, here we report our work of synthesizing supported zeolitic imidazolate framework ZIF-7 films and membranes in a facile and time-efficient manner at ambient pressure using a simple electrospray deposition technique. The membranes obtained under optimized conditions outperformed previously reported ZIF-7 membranes for H2/CO2 separation while showing rather noticeable improvement in H2 permeance which is roughly 4 to 10 times higher than the previous counterparts.