

## Efficient Xylene Separation

### Exploiting the gate-opening effect of 2D switching coordination networks for efficient xylene separation

#### Abstract:

We propose a counterintuitive approach to address the industrially challenging task of xylene separation, which is recognized as one of “the seven chemical separations to change the world”.

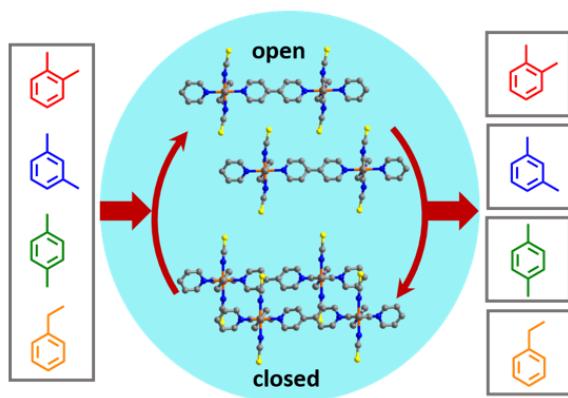
Specifically, we introduce a family of 2D switching coordination networks that can undergo guest induced gate-opening transformations between nonporous “closed” and porous “open” phases. Such stimuli-responsive metal-organic materials have the potential to selectively adsorb specific xylene isomers through the gate-opening mechanism.

Our primary objective is to overcome the longstanding trade-off between selectivity and adsorption capacity inherent in traditional adsorbents, thereby paving the way for highly efficient xylene separation.

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Proposed technology



#### 2D Switching Coordination Networks

- ❖ **Overall objective:** We propose a counterintuitive approach to address the industrially challenging task of xylene separation, which is recognized as one of “the seven chemical separations to change the world”. Our primary objective is to overcome the longstanding trade-off between selectivity and adsorption capacity inherent in traditional adsorbents, thereby paving the way for highly efficient xylene separation.
- ❖ **Scope:**
  - Preparation of flexible/switching metal-organic materials.
  - Evaluation of their stability and xylene adsorption performance.
  - Scale-up with green synthesis of the optimized materials.



WANG Shiqiang  
(Lead PI)