

The Efficient Greenhouse Gas (SF_6) Treatment:
ZIF-Based Mixed Matrix Membranes

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SF_6 , the most potent global warming gas among the existing greenhouse gases, has been used in various industrial applications, especially in the semiconductor areas. The membrane-based gas separation can be promising to mitigate the greenhouse gas emission. However, it is challenging to achieve both high permeability and selectivity with pure polymeric membranes due to the inherent drawbacks, the trade-off between permeability and selectivity. To overcome their limit, mixed matrix membranes (MMMs) consisting of highly selective molecular sieves and polymer matrix has been investigated. Zeolitic imidazolate frameworks (ZIFs), a relatively new class of molecular sieves, are known to be attractive to MMMs since a good adhesion between ZIFs and polymer matrix can be realized due to the presence of organic ligands in ZIFs. In this work, we evaluated the transport properties of pure polymeric membranes and MMMs with different loadings of ZIFs using O_2 , N_2 , and SF_6 to demonstrate the potential of membrane technology for SF_6 removal.