

MOF を用いた連続吸着分離プロセスの応用と経済性評価

(名大院工) 川尻 喜章

Applications and economic evaluations of continuous adsorptive separation processes using MOFs (*Graduate School of Engineering, Nagoya University*) Yoshiaki Kawajiri

Many MOFs have been reported to show unique properties for separation, but evaluating them in large-scale separation processes would require careful analysis. Experimental investigations to reveal properties of isotherm and kinetics must be performed, which must be analyzed to obtain information for process design and economic evaluations¹⁾. In this presentation, some case studies of utilizing MOFs for CO₂ separations are presented including carbon capture from flue gas, as well as direct air capture²⁾.

Keywords : MOF; separation process; adsorption; CO₂

数々の MOF について分離に関する物性が報告されてるが、大規模な分離プロセスに利用するために評価するためには慎重な解析が必要となる。吸着等温線に加えて速度を明らかにする実験を行った後、プロセス設計と経済性評価に必要な情報を得なければならない¹⁾。本発表では、MOF を CO₂ 分離に利用する複数の事例を紹介する。特に排ガスからの二酸化炭素回収、及び direct air capture についての紹介を行う²⁾。

1) Optimization and techno-economic analysis of rapid temperature swing adsorption (RTSA) process for carbon capture from coal-fired power plant. S. Swernath, K. Searcy, F. Rezaei, Y. Labreche, R. P. Lively, M. J. Realff, Y. Kawajiri, *Comput. Aided Chem. Eng.*, **2015**, 36, 253.

2) Systems Design and Economic Analysis of Direct Air Capture of CO₂ through Temperature Vacuum Swing Adsorption Using MIL-101(Cr)-PEI-800 and mmen-Mg₂(dobpdc) MOF Adsorbents. A. Sinha, L. A. Darunte, C. W. Jones, M. J. Realff, Y. Kawajiri, *Ind. Eng. Chem. Res.* **2016**, 56, 750.