# Application of Crystalline Microporous Materials for Molecular Separation

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Nowadays, chemical separation by distillation is said to account for around half of the energy used in industry. Therefore, development of more environmental-friendly separation processes is important.

Crystalline microporous materials are promising materials to separate molecules. One of them are zeolites; a family of crystalline microporous materials based on three-dimensional frameworks of silica and alumina tetrahedra. They exhibit useful properties including cation exchange ability, adsorption ability and molecular sieving ability owing to their negatively charged framework and to their well-defined and uniform pores of molecular dimension, respectively. Zeolites can separate gas/gas or liquid/liquid mixtures by the difference in molecular size and/or in affinity.

Recently, composites and continuous membranes of zeolites have been shown to be useful for various separations. A composite adsorbent of zeolites and magnetic particles which can be quickly and easily collected by an intense magnet has been proposed for removing substances from wastewater streams. Moreover, zeolites in the form of continuous membranes have been shown to enable separations of numerous gas/gas and liquid/liquid mixtures in the petrolium and petrochemical fields.

In this presentation, we introduce some examples and possibilities of molecular separations *via* application of zeolites.

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Research Interest: Separation Technologies (Adsorbents & membranes), Resource Circulation Technologies, Coating Technologies, Bioceramics Synthesis and Forming of Ceramics, Application of External Fields