



Principal Investigator

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Adopted Theme

Concept-proof of new generation CO₂ capture materials using 2.5-dimensional COFs and the exploration of new applications

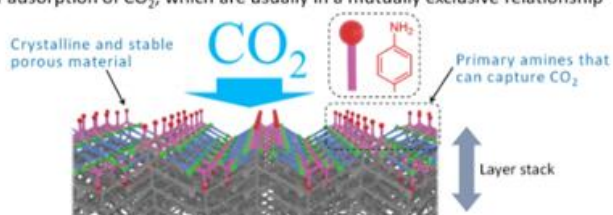
Subject of Research

Concept-proof of new generation CO₂ capture materials using 2.5-dimensional COFs and the exploration of new applications

Overview

Ultrahigh-density primary amines regularly allocated in the nanopores

⇒ Simultaneous achievements of the high CO₂/N₂ selectivity and low heat of adsorption of CO₂, which are usually in a mutually exclusive relationship



- High thermal stability and crystallinity
- Extraordinarily large single-crystal size for COFs of ≥ 0.1 mm achieved
- Many potential applications possible due to the unique structure

Rooted on the world's first 2.5D-COF (COF = Covalent Organic Framework) technology we developed, we pursue the creation of a startup in cooperation with prospective customer companies to open up the practical frontiers of COFs. We will conduct a concept proof of a new generation solid CO₂ separation materials that allow for economically viable implementations of CCS and CCU. We will also develop new applications for this material. We aim to develop a global startup that conduct the development, sales, and licensing of innovative CO₂ adsorbents that contribute to the reduction of CO₂ emissions, exploring the new domain of COF applications that answer the customer and social needs.

Business Models (when applying)

1. Material supply model: COF is sold to plant system and equipment manufacturers.
2. Technology licensing model: COF technology with secured intellectual property is licensed to domestic and overseas manufacturing companies.
3. Joint development model: We support the R&D and business development of customers utilizing our know-how, data, and R&D capabilities for materials development and production.

Activity Planning (when applying)

Our R&D activities include (1) improving durability against trace impurities contained in exhaust gas and demonstrating long-term durability, (2) establishing a scale-up production method for the material, (3) developing new uses for the 2.5D-COFs, and (4) developing new 2.5D-COFs from overwhelmingly low-cost feedstocks. Our activities related to business development include (1) conducting feasibility studies through collaboration with customer candidates and partners in the CO₂ capture and separation field, (2) identifying potential customers and partners through conducting market research, and (3) formulating patent strategies to build robust patent portfolios.