スルホン酸とアミンからなるカゴ型多孔質有機塩の構築と金属錯体触媒の簡便な固定

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Construction of Cage-like Porous Organic Salts Composed of Sulfonic Acid and Amine and Facile Heterogenization of Metal Complex Catalysts (*Graduate School of Engineering, Osaka University*) ○Takumi Ichimura, Hiroi Sei, Kouki Oka, Norimitsu Tohnai

Metal complex catalysts are widely used in chemical reactions, such as cross-coupling. In order to separate and reuse these catalysts facilely, their immobilization into porous materials and the use as heterogeneous catalysts is preferable. Previously, we have reported porous organic salts (**POS**s) composed of sulfonic acid and bulky amine via ionic hydrogen bonds[1]. In particular, cage-like **POS**s can immobilize functional molecules (luminescent molecules, *etc*) into their cage pores.

In this study, we achieved the facile immobilization of the Ir catalyst[2], which catalyzes the oxidation of alcohols with dehydrogenation to produce hydrogen gas, by only the coexistence of the catalyst during the recrystallization (**Figure 1**). The adsorption properties of this structure, which adsorbs CO_2 but not hydrogen gas (**Figure 2**) would enable to suppress the reverse reaction (hydrogenation) and improve the activity of the catalyst for hydrogen gas production.

Keywords : Porous Material; Hydrogen bond; Metal Complex Catalyst

金属錯体触媒はクロスカップリング反応など多くの反応に利用されるが、使用した触媒の分離・回収を容易にするため、多孔質材料に固定し不均一触媒とするのが好ましい。これまで我々は、スルホン酸と嵩高いアミンからなるイオン性水素結合に基づく多孔質有機塩（**POS**s）について報告してきた[1]。なかでも、カゴ型空孔を有する多孔質有機塩は発光分子などの機能性分子を空孔へ内包し固定できる。

本研究では、脱水素化を伴うアルコールの酸化反応を触媒する Ir 触媒[2]を再結晶時に共存させるだけで、カゴ型空孔内への簡便な固定を達成した（**Figure 1**）。同構造は二酸化炭素を吸着するが水素ガスを吸着しないため（**Figure 2**）、生成した水素ガスによる逆反応（水素化反応）を抑制し、Ir 触媒の水素発生反応の活性向上が期待できる。

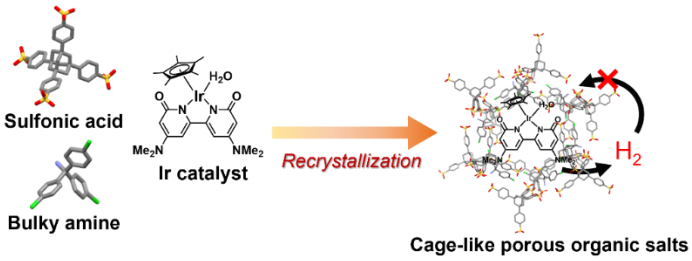

Figure 1. Immobilization of Ir catalyst into cage-like porous organic salts.

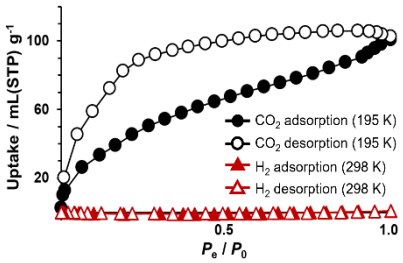

Figure 2. Gas adsorption isotherms of cage-like porous organic salts.

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2) M. Kuwahara, M. Nishioka, M. Yoshida, K. Fujita, *ChemCatChem*., **2018**, 10, 3636.