

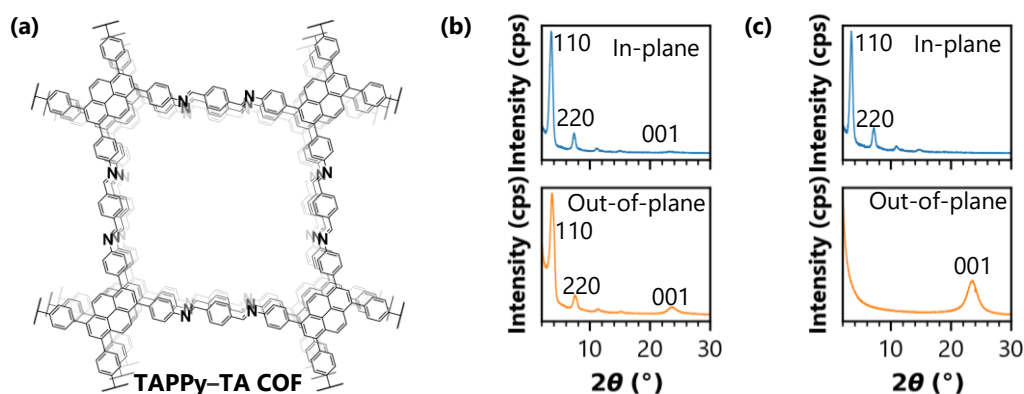
## 共有結合性有機構造体の塗布重合成膜における結晶子配向の湿度依存性

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 Humidity-Dependent Crystallite Orientation in the Preparation of Covalent Organic Framework Films through a Solution-Deposition-Polymerization Approach (<sup>1</sup>*School of Engineering, Osaka University*, <sup>2</sup>*Graduate School of Engineering, Osaka University*) ○  
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Covalent organic frameworks (COFs) are crystalline, porous polymers constructed through covalent bonds between organic main-group elements. We are developing a solution-deposition-polymerization method to efficiently prepare COF films. In this method, a monomer-containing solution is dropped onto a substrate, and the target COF is formed by polymerizing the monomers during solvent evaporation. Our recent studies have shown that thin films of TAPPy-TA COF, an imine-linked 2D COF (Figure 1a), exhibit varied crystallite orientations depending on the environmental humidity during solvent evaporation. In particular, high relative humidities (RHs) lead to films with no preferred crystallite orientation, while lower RHs result in a stronger face-on preference (Fig1b, c). This presentation will explain the details of this observation and discuss its plausible mechanism.

**Keywords :** Covalent Organic Frameworks (COFs); Film Morphology; Preferred Orientation

共有結合性有機構造体 (COF) は、有機典型元素間の共有結合によって構築される結晶性の多孔質ポリマーである。我々はその効率的な成膜に向け、基板にモノマー溶液を塗布したあと、乾燥の過程で重合を進行させる「塗布重合」を活用したプロセスの開発を進めている。最近の検討で、イミン連結型 2 次元 COF である TAPPy-TA COF (Fig. 1a) を成膜する際、周囲湿度が高いと薄膜中の結晶子は優先配向をもたない一方、低湿度下では基板に対して face-on 配向を示す現象<sup>1)</sup>が確認された (Fig. 1b, c)。発表ではこの現象の詳細を述べるとともに、そのメカニズムを考察する。



**Fig. 1** (a) Chemical structure of TAPPy-TA COF. (b, c) In-plane and out-of-plane XRD patterns of TAPPy-TA COF films prepared (b) at 15% RH and (c) in dry N<sub>2</sub>.

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