Crystalline Framework Composed of Benzo[e]pyrenedicarboxylic Acid

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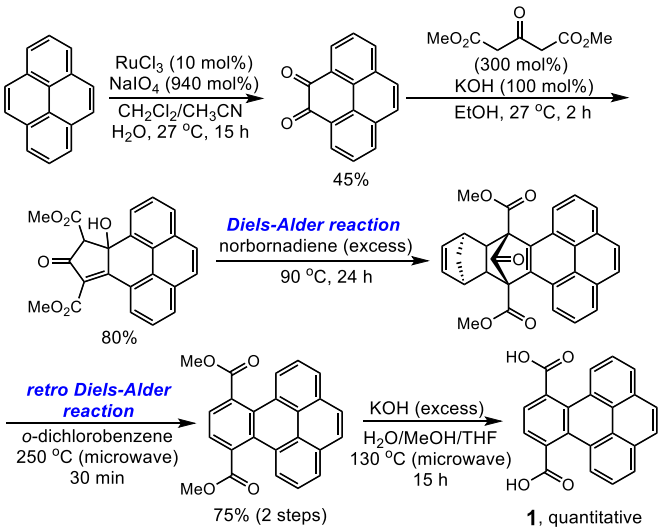
Keywords: Pyrene; Porous Molecular Crystal; Hydrogen Bond

Porous organic materials composed via weak intermolecular interactions such as hydrogen bonds[1)] are receiving significant interest due to their softer structure compared to metal- or covalent-organic frameworks (MOFs and COFs). This makes them more flexible and responsive to stimuli. This work examined a new pyrene derivative **1** that contains a benzene dicarboxylic acid component. This derivative is used as the main building block for creating porous organic materials based on pyrene. As pyrene is known for its unique properties such as high charge carrier mobility, light absorption, solution processability, and thermal stability[2)], the resulting frameworks are expected to exhibit various electric properties by altering the guest molecules inside them.



Scheme 1. Synthesis of **1**.

Synthesis of **1** was performed with the following Scheme 1. Solution-state analysis of **1** revealed a solvatofluorochromism, indicating the presence of intramolecular donor-acceptor interactions. Single crystal X-ray analysis revealed that **1** gave two different crystal structures depending on the crystallization conditions: porous and non-porous ones (Figure 1). The tightly packed non-porous structure was stabilized by hydrogen bond, π-π, and CH-π interactions, while the porous one mainly relied on the former two.

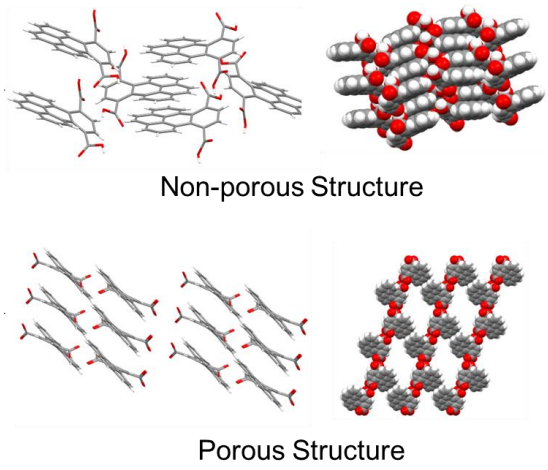


Figure 1. Non-porous and porous structures of **1**.

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