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Synthesis, crystal structure and adsorption property of a microporous Cd(II) metal-organic framework based on 1H-imidazo[4,5-f][1,10]phenanthroline

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Abstract

A microporous metal-organic framework (MOF), [Cd(IP)Cl]_n (**1**, HIP = 1H-imidazo[4,5-f][1,10]phenanthroline), with 1D square channels along the *c* axis was constructed through the solvothermal method. Because of the polar nitrogen atoms and the π -electron-rich ligand, activated MOF **1a** presents a strong interaction with CO₂, showing selective capture of CO₂ from a mixture of CO₂/N₂. Additionally, MOF **1a** also shows significant selective capture of CO₂ from CO₂/CH₄ and CO₂/C₂H₄ mixtures due to the sieving effect of the 1D channels. The column breakthrough experiment results further confirmed that microporous MOF **1a** could be used as a potential porous material for selective CO₂ adsorption.

Keywords: metal organic frameworks; gas separation; CO₂ separation.

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