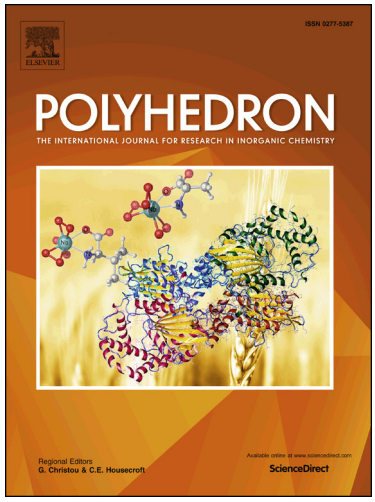


# Synthesis, crystal structure and adsorption property of a microporous Cd(II) metal-organic framework based on 1H-imidazo[4,5-f][1,10]phenanthroline

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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 $CO_2$, showing selective capture of $CO_2$ from a mixture of $CO_2/N_2$. Additionally, MOF **1a** also shows significant selective capture of $CO_2$ from $CO_2/CH_4$ and $CO_2/C_2H_4$ 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 $CO_2$ adsorption.

***Keywords***: *metal organic frameworks; gas separation; $CO_2$ separation.*