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### **A soluble polymer with intrinsic porosity for flue gas purification and natural gas upgrading**

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Insoluble adsorbents with robust porous frameworks and high surface areas have shown good performance in flue gas purification and natural gas upgrading. However, fouling and sorbent attrition always occurs and decay their performance in practical applications. Here, we describe a 2,4-diamino-1,3,5-triazine (DAT) functionalized organic polymer with intrinsic microporosity (DATPIM) for selective CO<sub>2</sub> capture. DATPIM is resistant to most solvents except DMSO and NMP, which allows solution-processing for fabrication into different morphologies, eliminates swelling during gas separation operations, and permits reuse after simple treatments if fouled or blocked. The incorporation of DAT groups results in DNA-like multiple H-bonds and plenty of Lewis base sites, which greatly enhance CO<sub>2</sub> adsorption and separation capabilities, leading to state of the art performance in flue gas purification and natural gas upgrading.

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