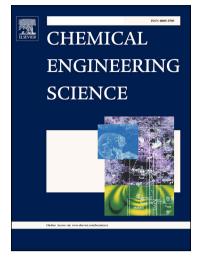
### Accepted Manuscript

A Solvent 'Squeezing' Strategy to Graft Ethylenediamine on  $Cu_3(BTC)_2$  for Highly Efficient CO<sub>2</sub>/CO Separation

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## ACCEPTED MANUSCRIPT

## A Solvent 'Squeezing' Strategy to Graft Ethylenediamine on Cu<sub>3</sub>(BTC)<sub>2</sub> for Highly Efficient CO<sub>2</sub>/CO Separation

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#### Abstract

Highly efficient separation of residual carbon dioxide (CO<sub>2</sub>) from syngas, mainly composed of carbon monoxide (CO) and hydrogen (H<sub>2</sub>), could not only make its utilization more energetically efficient but also avoid catalysts poisoning in some industrial applications. In the attempts to address this issue, it is acknowledged that CO<sub>2</sub>/CO separation is the vital step since H<sub>2</sub> is a nonpolar molecules, difficult to be polarized and could be easily separated from CO<sub>2</sub>. Herein, we report a novel strategy to graft basic ethylenediamine (ED) molecules onto porous metal-organic frameworks (MOFs) as solid adsorbents for CO<sub>2</sub>/CO separation via solvent 'squeezing' approach, in which Cu<sub>3</sub>(BTC)<sub>2</sub> (BTC = 1,3,5-benzenetricarboxylate) MOF was employed as the pristine MOF. Surprisingly, the ED-grafted Cu<sub>3</sub>(BTC)<sub>2</sub> shows unprecedented enhancement of CO<sub>2</sub>/CO selectivity of 226% at 273 K and 861% at 298 K, respectively, in comparison with the solvent-free Cu<sub>3</sub>(BTC)<sub>2</sub>. Moreover, despite the large isosteric heats of adsorption of CO<sub>2</sub> on the ED-grafted Cu<sub>3</sub>(BTC)<sub>2</sub>, it could be easily regenerated at moderate temperature. This work provides an

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