

Cu(I)-impregnated MOF-derived carbons (MDCs) and activated carbon for high CO adsorption capacity and CO/CO<sub>2</sub> selectivity

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The research of selective adsorbent materials for carbon monoxide with high CO/CO<sub>2</sub> selectivity and thermal/chemical stability is a challenge faced in carbon neutralization. Conventional way to treat CO is to use a catalyst to oxidize CO to CO<sub>2</sub>, but it emits CO<sub>2</sub> to the environment. Nevertheless, CO is an important industrial raw material for C1 chemistry, thus the development and utilization of CO are needed for the environmental protection, and chemical industry. In this study, Cu(I)-impregnated activated carbon and MDCs are prepared as the adsorbent for CO/CO<sub>2</sub> separation. The impregnated adsorbents showed better CO adsorption than CO<sub>2</sub> and had selective CO adsorption compared to CO<sub>2</sub>. To predict adsorption isotherms of equimolar CO and CO<sub>2</sub> mixtures, Ideal adsorbed solution theory (IAST) was applied. Cu(I)-impregnated activated carbon and MDCs appears promising as an adsorbent material for effective CO/CO<sub>2</sub> separation.