**Biomimetic Zr-based-MOF for CO2 capture for air purification**

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**Abstract**

In order to safe clean environment and overcome the climate change problems, new developments in controlling greenhouse gas emissions have been implemented to address the global climate conservation concern. As, CO2 has a major role in global climate change, thus, carbon capture technology has been employed as a promising route to reduce the CO2 concentration into the atmosphere under autogenic pressure. Considering the low CO2 partial pressure in the practical industry, improving CO2 adsorption and separation performance at low pressure (including atmospheric pressure) is more meaningful. In this regard, porous metal organic frameworks (MOFs) have been known as the promising materials for CO2 adsorption. A novel, green, thermally stable, and biocompatible zirconium metal–organic framework (MIP 202) was evaluated as green adsorbent for CO2 separation from polluted air. The physicochemical properties of synthetized MIP 202 were identified using various techniques. The crystalline and morphological structures of the bio-material were investigated using X-ray diffraction (XRD) and scanning electron microscopy (SEM), transmission electron microscopy (TEM) respectively. The BET surface area that recorded as 58.8m2/g confirms the production of MIP 202. The prepared bio-MOF were utilized as fixed bed adsorbent for CO2 at ambient conditions. The influence of CO2 concentration at low concentrations (30- 100 ppm) was studied to evaluate the separation efficiency of MIP 202 at low gas concentrations. It was evident that the eco-friendly MIP 202 displayed high uptake (51.34 mgCO2/ gm MIP 202) capacity at ambient conditions, making it a potentially useful adsorbent material for post-combustion carbon dioxide capture and biogas stream purification.

*Keywords: MIP-202, Bio- MOF, CO2 uptakes, Air purification greenhouses gas*

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