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Thermal treatment induced transition from $Zn_3(OH)_2(BDC)_2$ (MOF-69c) to $Zn_4O(BDC)_3$ (MOF-5)

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Abstract

A simple thermal treatment induced transition from $Zn_3(OH)_2(BDC)_2$ (MOF-69c) to $Zn_4O(BDC)_3$ (MOF-5) is reported. Phase crystallinity, pore characteristics and hydrogen storage capacities of the resulting crystals were investigated. It is shown that the structural transition from $Zn_3(OH)_2(BDC)_2$ (MOF-69c) to $Zn_4O(BDC)_3$ (MOF-5) could be induced by simply employing the optimal thermal treatment conditions of 200 °C for 48 h in open air. The resultant relatively lower specific surface area of MOF-5 crystals compared to MOF-69c was in agreement with the increased pore diameter and decreased hydrogen storage capacity at 1 bar and 77 K.