Two Dimensional Metal Organic Framework of Cadmium (II) and Benzenedicarboxylate Ion

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Metal-organic frameworks (MOFs) are crystalline porous materials that synthesized by mixing organic ligands and metal salts in hydrothermal or solvothermal reactions under relatively mild conditions [1]. MOFs have many application and they are useful in gas storage, adsorption based gas/vapor separation, shape/size selective catalysis, drug storage and delivery and as templates in preparation of low dimensional materials [2].

Syntheses and structures of cadmium 1,4-benzenedicarboxylate (bdc) at low temperature (150K) have been studied earlier [3], and here we report the same compound prepared under lower temperature in normal pressure and the structure was solved at ambient temperature. A mixture of Cd(NO3)2.4H2O (0.5 mmol) and bdc (0.5 mmol) dissolved in 6 mL dimethylformamid at room temperature. The solution was then heated at 60°C for 120 hours. Colorless blocked-shape crystals of [Cd3(bdc)3(DMF)4]n suitable for crystallography were obtained after cooling to the room temperature.

The crystal structure of [Cd3(bdc)3(DMF)4]n was satisfactorily described in the monoclinic space group C2/c (No. 15). Within three Cd(II) ions, the two symmetry related cadmium atoms (Cd1) have a different geometry from the central one (Cd2), in which the outer Cd1 are seven oxygen-coordinated to five oxygen atoms from three bdc ions and two DMF molecules. The central Cd2 coordinated to six oxygen atoms from six different bdc in a distorted octahedral geometry. In this structure, the bdc anion bridge between Cd1 (O2CR)6 to form a layer structure.

Figure. The cadmium environment in the [Cd3(bdc)3(DMF)4]n compound.

REFERENCES