Tuning the topology of a 2D metal–organic framework from 2D to 3D using modulator assisted synthesis†

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Abstract

Two new metal–organic frameworks based on 2,2′-bipyridine-4,4′-dicarboxylate and La(III) ions were prepared under solvothermal conditions. $[La(bpda)_{3/2}(dmf)_2]\cdot dmf\cdot H_2O$, MSU-10, was isolated as a 2D network structure. By introducing a modulator, 1,10-phenanthroline, the 3D network $[La(bpda)_{3/2}(dmf)(H_2O)_2]\cdot dmf$ MSU-11 could be isolated with the unusual rod-MOF topology **zbj**. Both the 2D and 3D networks are stable upon guest removal and the activated phases of MSU-10 and MSU-11 exhibit some phase change when soaked in solvents for 24 h. Network analysis allowed the identification of MSU-11 as isoreticular with MOF-80 built from different linkers and metal ions.