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SUPPLEMENTARY MATERIAL

Tuning Packing, Structural Flexibility and Porosity in 2D Metal-Organic Frameworks by Metal Node Choice

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Contents

1. Additional Structural Information for *β*-ML1 and ML1 (M = Co(II) or Ni(II))

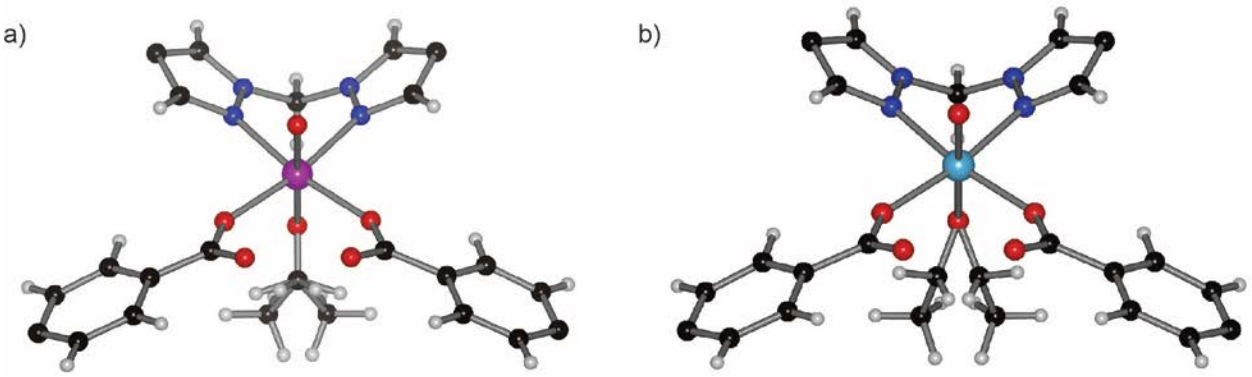

Figure S1. a) A view of the coordination sphere of the Co(II) and Ni(II) centres of (a) ***β*-CoL1** and (b) ***β*-NiL1** respectively. The hydrogen atoms of the water ligand could not be located in the difference map.

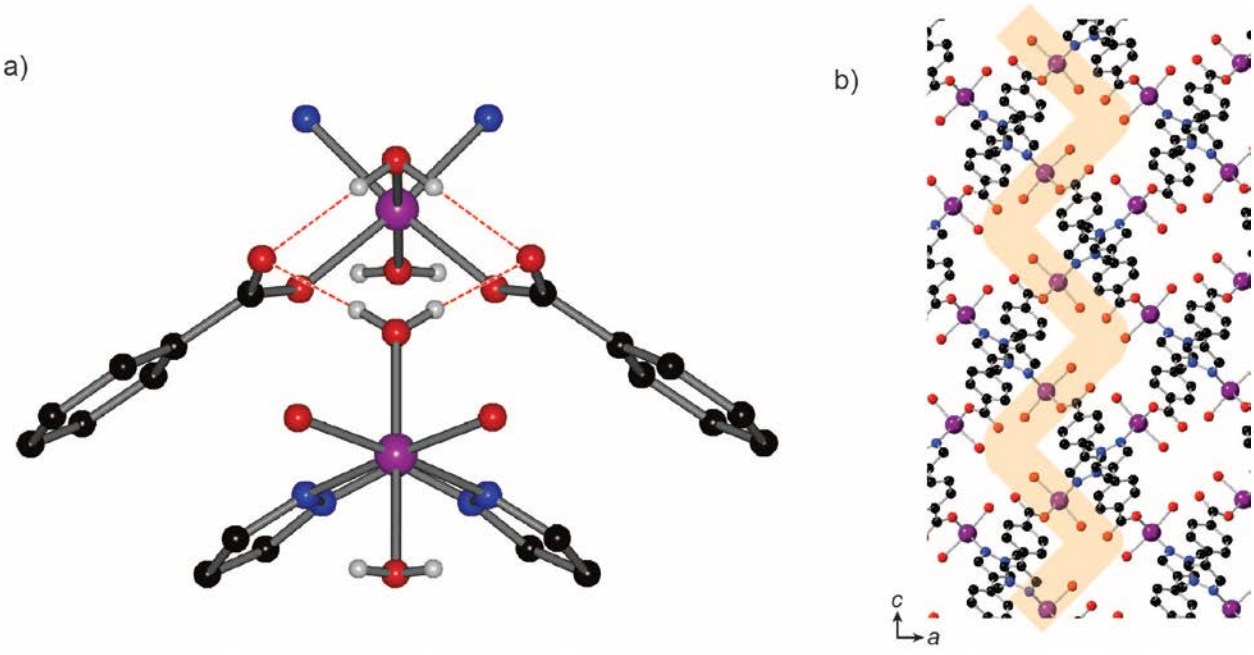

Figure S2. a) A view of the coordination sphere of the Co(II) centre of **CoL1** highlighting the perpendicular relationship between the metal centres of two separate 2-D layers; b) the zig-zag conformation of the Co(II) metal centres viewed along the *b* axis (identical for **NiL1**).

2. Unit Cell Parameters for the Solvent Exchanged Forms of NiL1

Table S1. Unit cell parameters for the various solvent exchanged forms of **NiL1**.

Sample	**Treatment**	***a* (Å)**	***b* (Å)**	***c* (Å)**	***V* (Å^3)**
NiL1·*x*S	as-synthesised	11.2054(2)	20.1664(4)	13.3065(3)	3006.90(11)
NiL1·EtOH	ethanol exchanged	10.6799(2)	20.3654(3)	13.2980(3)	2892.32(9)
NiL1·MeOH	methanol exchanged	11.409(2)	20.322(4)	13.065(3)	3029.2(11)
NiL1·Tol	toluene exchanged	10.933(2)	20.875(4)	11.989(2)	2736.2(10)

3. Powder X-ray Diffraction

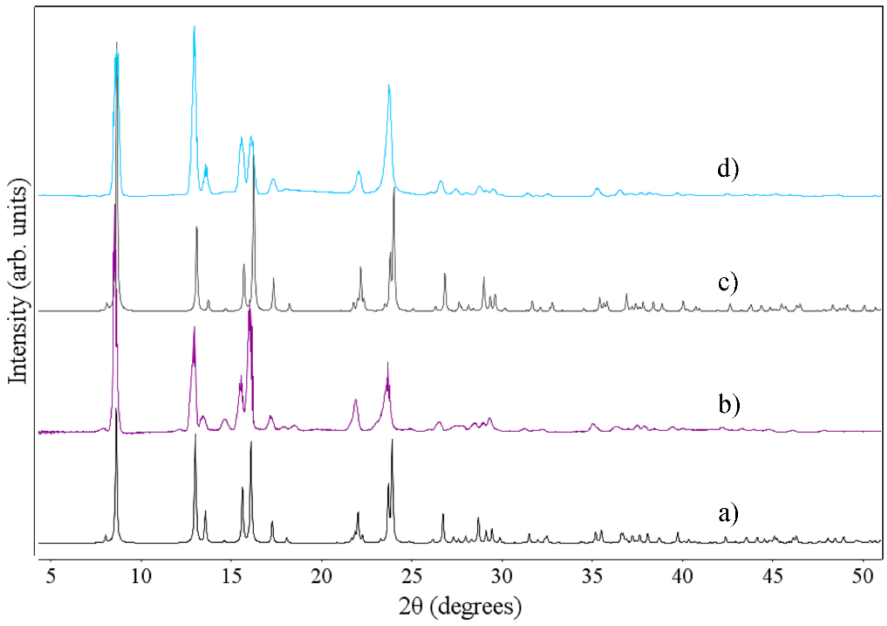

Figure S3. a) PXRD patterns of a) ***β*-CoL1** simulated; b) ***β*-CoL1** as-synthesised; c) ***β*-NiL1** simulated; d) ***β*-NiL1** as-synthesised.

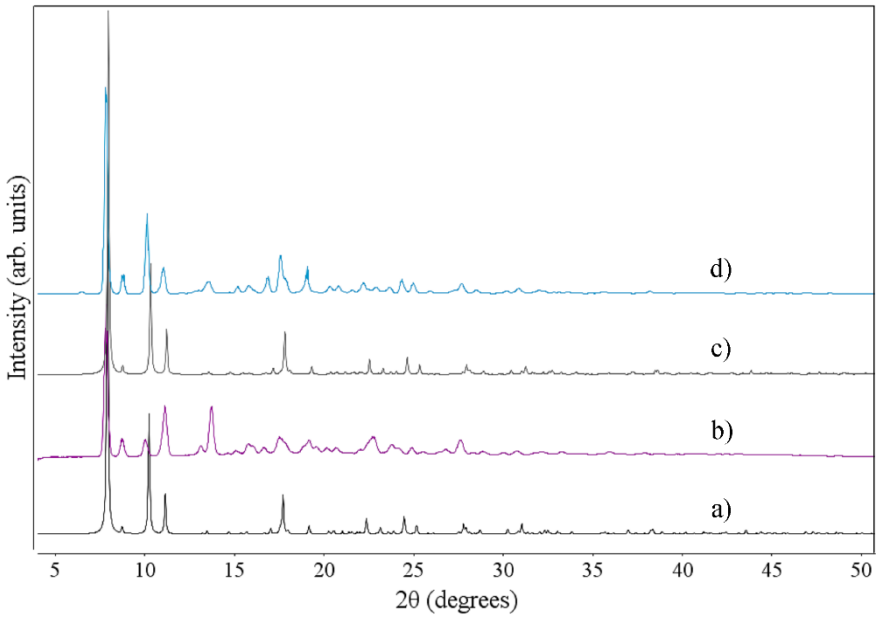

Figure S4. a) PXRD patterns of a) **CoL1** simulated; b) **CoL1** as-synthesised; c) **NiL1** simulated; d) **NiL1** as-synthesised.

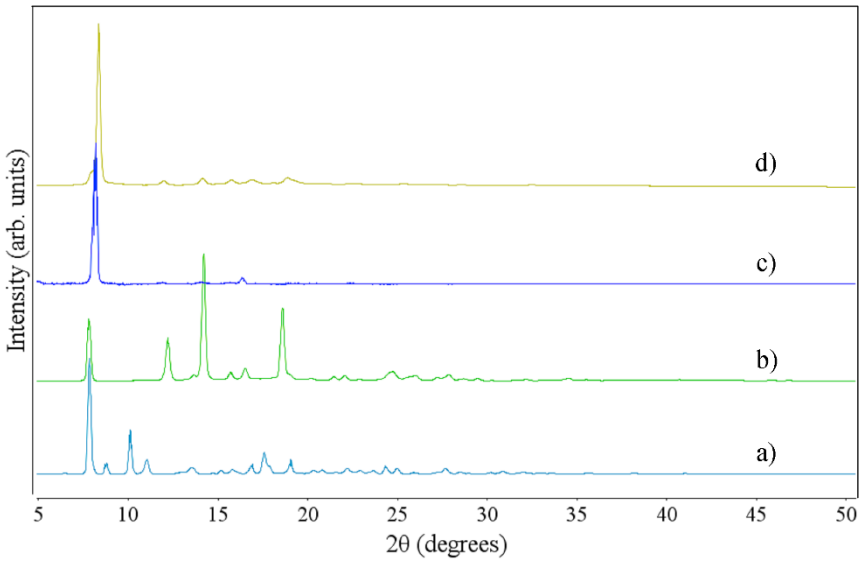

Figure S5. a) PXRD patterns of a) **NiL1** as-synthesised; b) **NiL1·*x*CH$_3$OH** heated to 100 °C; c) **CoL1** treated at 260 °C; d) **NiL1** treated at 260 °C.

4. Gas Adsorption

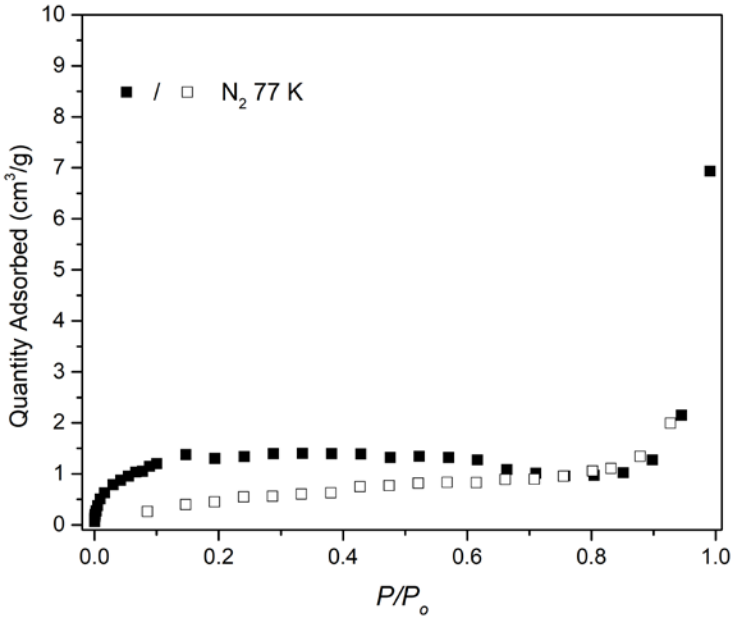

Figure S6. a) N_2 isotherm of **NiL1-*ac*** measured at 77 K. Filled and empty symbols represent the adsorption and desorption processes respectively.

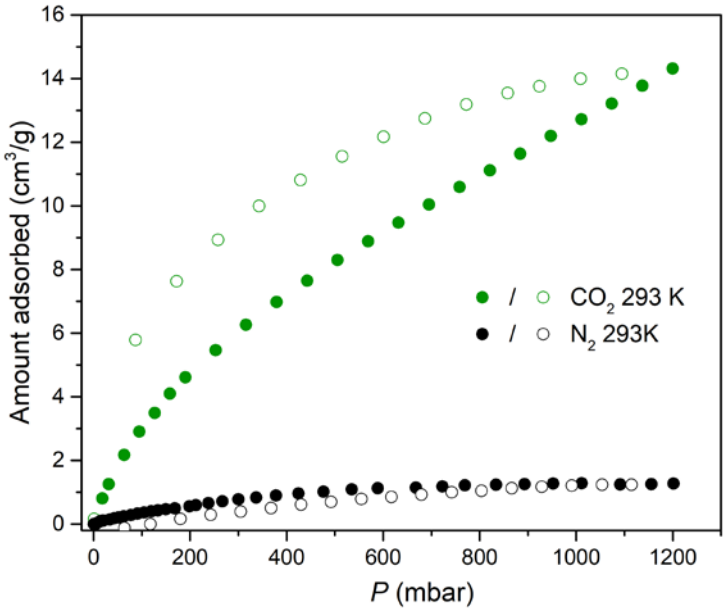

Figure S7. a) 293 K CO_2 and N_2 isotherms of **NiL1-*ac***. Filled and empty symbols represent the adsorption and desorption processes respectively.