

## Supporting information:

### A flexible copper based microporous metal-organic framework displaying selective adsorption of hydrogen over nitrogen

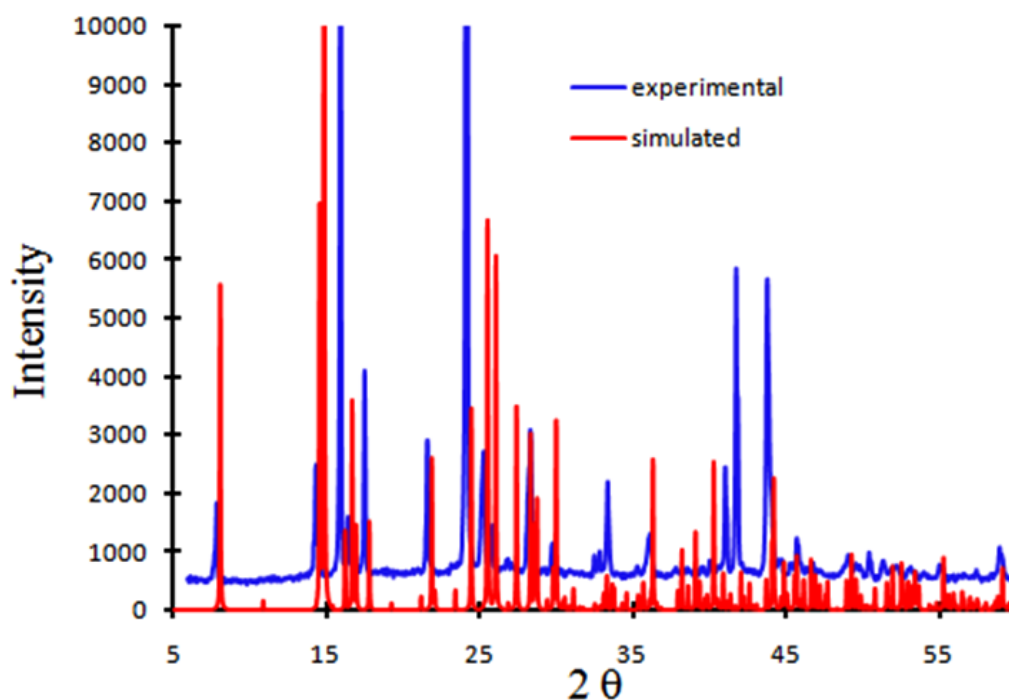
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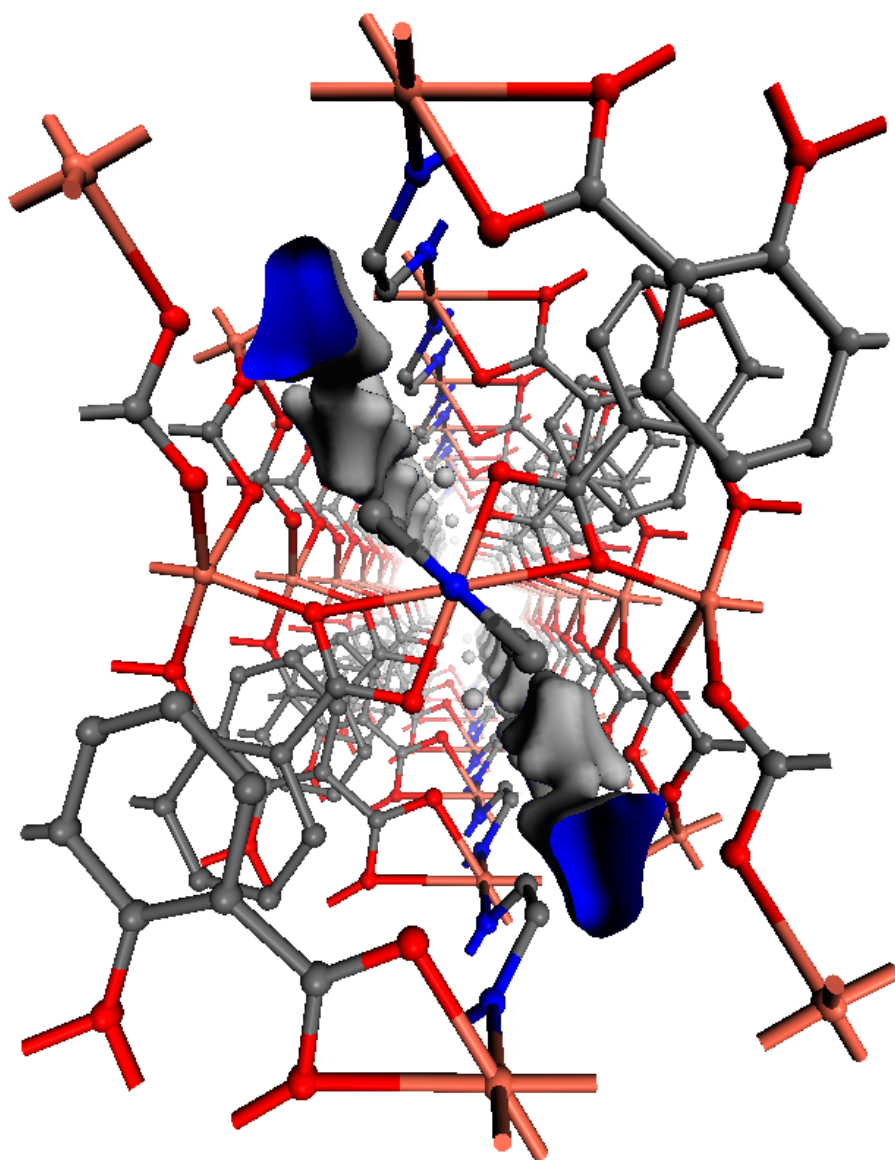
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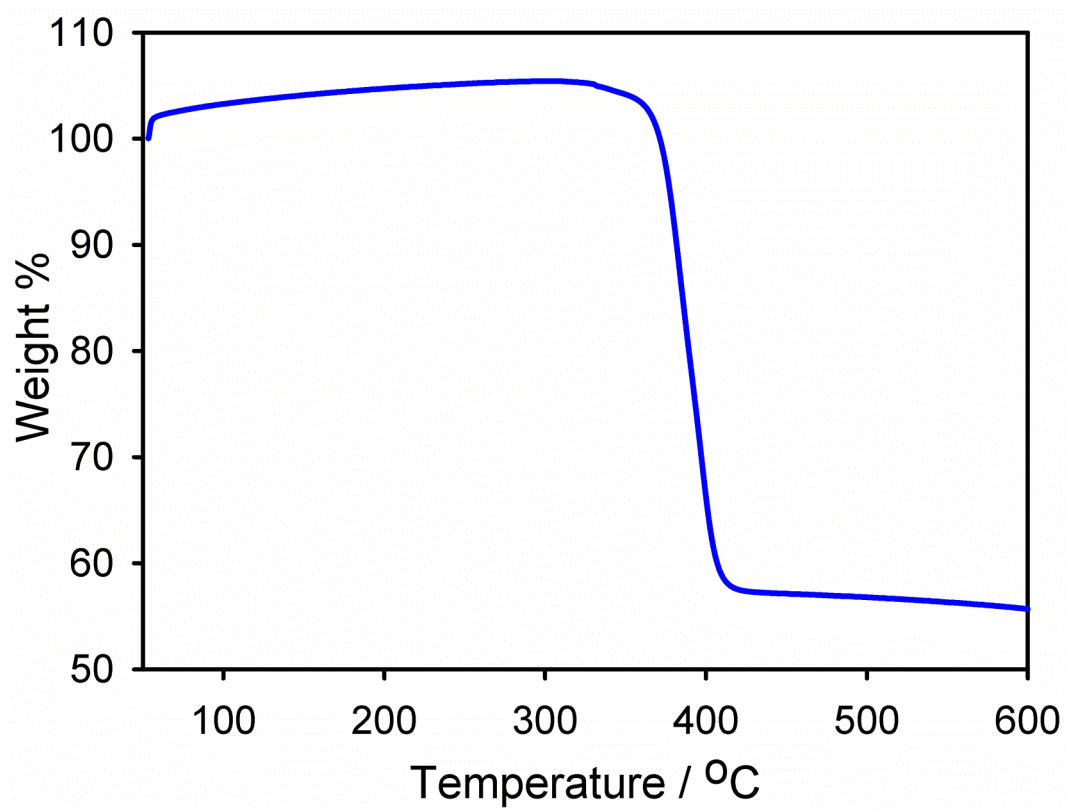
<sup>d</sup> Bragg Institute, Australian Nuclear Science and Technology Organisation, PMB 1, Menai, NSW 2234, Australia.



**Figure S1.** Powder diffraction of microporous framework **1** indicating a phase pure material



**Figure S2.** Perspective view down the  $c$ -axis of microporous framework **1**. Blue and grey channels indicate the accessible surface areas available within the structure.



**Figure S3.** Thermogravimetric analysis of microporous framework **1**. The trace confirms the small size of the porous channels due to the absence of solvent-related weight loss at low temperature.

**Table S1.** Gas Adsorption/Desorption data

| Nitrogen       |                                      |  | Hydrogen       |                                      |
|----------------|--------------------------------------|--|----------------|--------------------------------------|
| Pressure (atm) | Volume adsorbed (cm <sup>3</sup> /g) |  | Pressure (atm) | Volume adsorbed (cm <sup>3</sup> /g) |
| 5.24E-03       | 0.0082                               |  | 5.13E-03       | 0.5326                               |
| 6.26E-03       | 0.0261                               |  | 6.14E-03       | 0.6176                               |
| 7.27E-03       | 0.0544                               |  | 7.15E-03       | 0.7027                               |
| 8.29E-03       | 0.0743                               |  | 8.16E-03       | 0.7879                               |
| 9.31E-03       | 0.0939                               |  | 1.90E-02       | 1.5951                               |
| 2.16E-02       | 0.2793                               |  | 2.06E-02       | 1.7168                               |
| 3.16E-02       | 0.4414                               |  | 3.01E-02       | 2.4504                               |
| 4.17E-02       | 0.5871                               |  | 4.00E-02       | 3.2889                               |
| 5.16E-02       | 0.744                                |  | 5.00E-02       | 4.1056                               |
| 6.16E-02       | 0.8895                               |  | 6.00E-02       | 4.9048                               |
| 7.17E-02       | 1.0346                               |  | 7.00E-02       | 5.7063                               |
| 8.15E-02       | 1.3033                               |  | 8.00E-02       | 6.5161                               |
| 9.16E-02       | 1.4668                               |  | 8.99E-02       | 7.334                                |
| 1.02E-01       | 1.6203                               |  | 1.00E-01       | 8.1487                               |
| 1.12E-01       | 1.7707                               |  | 1.10E-01       | 8.9616                               |
| 2.10E-01       | 3.04                                 |  | 2.04E-01       | 16.2894                              |
| 3.09E-01       | 4.2711                               |  | 3.03E-01       | 24.7704                              |
| 4.09E-01       | 5.3401                               |  | 4.04E-01       | 32.9198                              |
| 5.10E-01       | 8.6118                               |  | 5.04E-01       | 40.2432                              |
| 6.09E-01       | 9.8354                               |  | 6.04E-01       | 46.0071                              |
| 7.08E-01       | 10.9189                              |  | 7.03E-01       | 51.3171                              |
| 8.08E-01       | 12.0877                              |  | 8.03E-01       | 55.9595                              |
| 9.07E-01       | 13.254                               |  | 9.08E-01       | 56.914                               |
| 8.92E-01       | 13.0627                              |  | 8.93E-01       | 56.7856                              |
| 8.40E-01       | 12.4526                              |  | 8.43E-01       | 56.3384                              |
| 7.90E-01       | 12.4158                              |  | 7.93E-01       | 55.604                               |
| 7.41E-01       | 11.7725                              |  | 7.43E-01       | 53.2994                              |
| 6.90E-01       | 10.9869                              |  | 6.93E-01       | 50.9534                              |
| 6.41E-01       | 10.2674                              |  | 6.43E-01       | 48.3219                              |
| 5.90E-01       | 9.5922                               |  | 5.93E-01       | 45.642                               |
| 5.40E-01       | 9.3006                               |  | 5.43E-01       | 42.7549                              |
| 4.90E-01       | 9.0335                               |  | 4.93E-01       | 39.7365                              |
| 4.40E-01       | 8.3556                               |  | 4.43E-01       | 36.0749                              |
| 3.90E-01       | 7.5052                               |  | 3.93E-01       | 32.3737                              |
| 3.40E-01       | 6.7489                               |  | 3.43E-01       | 28.3031                              |
| 2.90E-01       | 5.9274                               |  | 2.93E-01       | 24.2036                              |
| 2.39E-01       | 5.1874                               |  | 2.43E-01       | 19.8797                              |
| 1.89E-01       | 4.3865                               |  | 1.93E-01       | 15.6195                              |
| 1.39E-01       | 3.8492                               |  | 1.43E-01       | 11.7154                              |
| 9.86E-02       | 3.0314                               |  | 1.02E-01       | 8.485                                |
| 4.90E-02       | 2.2821                               |  | 5.18E-02       | 4.3521                               |
| 2.06E-02       | 0.2755                               |  |                |                                      |
|                |                                      |  |                |                                      |