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Supplementary information

Syntheses, structures, thermal stabilities, magnetism and luminescence of two 3D metal phosphonates

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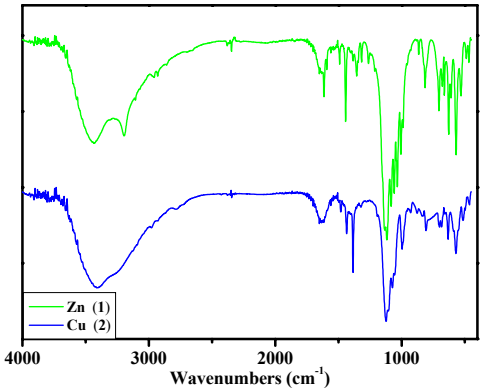

Fig. S1 IR curves of **1** and **2**.

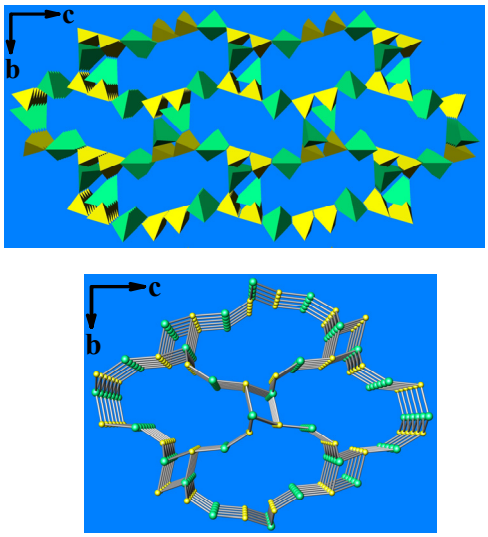

Fig. S2 Polyhedral (top) and ball-stick (bottom) view of the 3D framework for **1**.

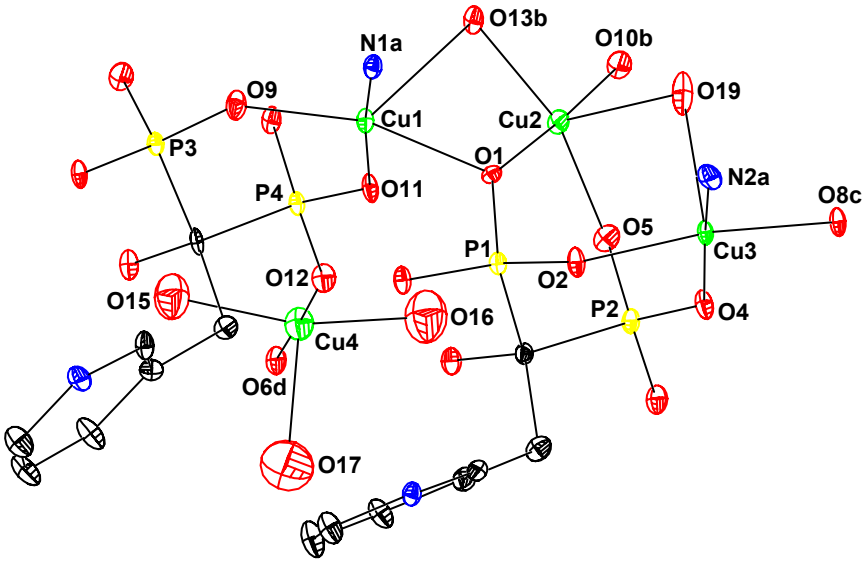

Fig. S3 ORTEP view of the asymmetric unit (ellipsoids at 25% probability) of **2**. Unrelated atoms are omitted for clarity. Symmetry codes: *a* - x + 1, - y, - z + 1; *b* - x + 1, - y, - z; *c* x, y + 1, z; *d* - x + 2, - y, -z.

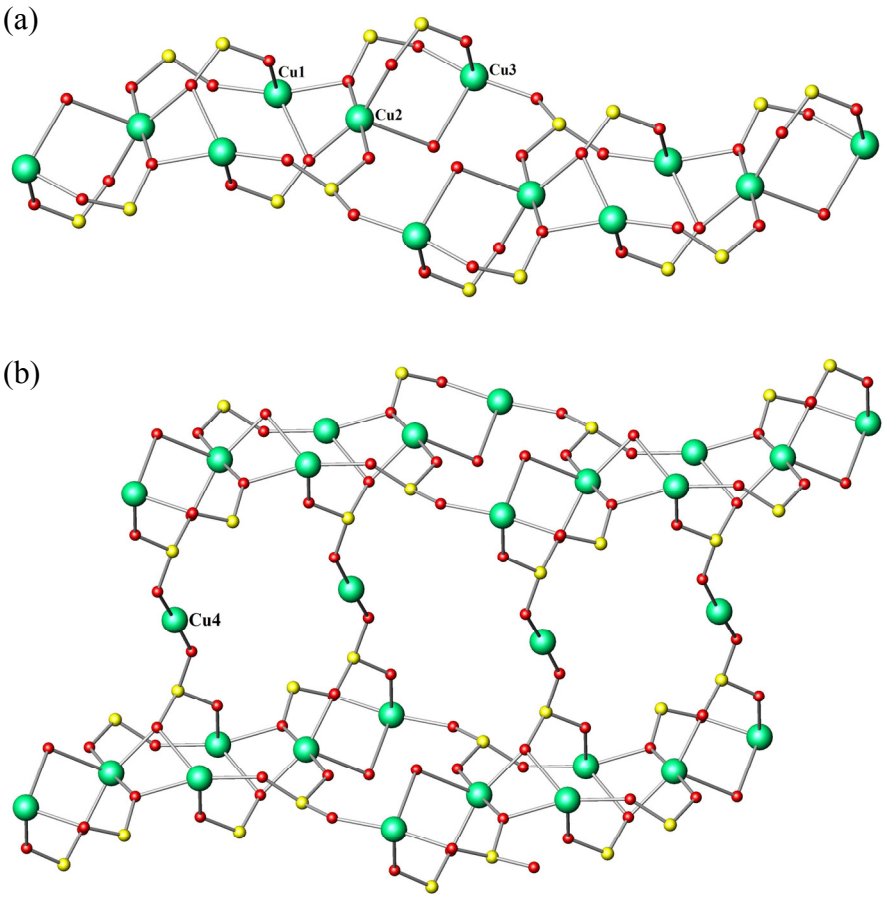

Fig. S4 Ball-stick view of (a) the chain and the hybrid layer in **2**.

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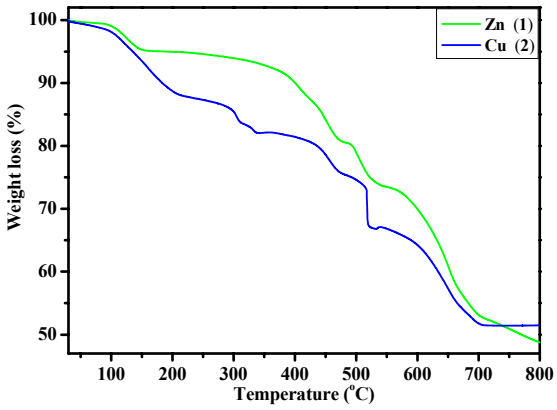

Fig. S5 TGA curves of **1** and **2**.

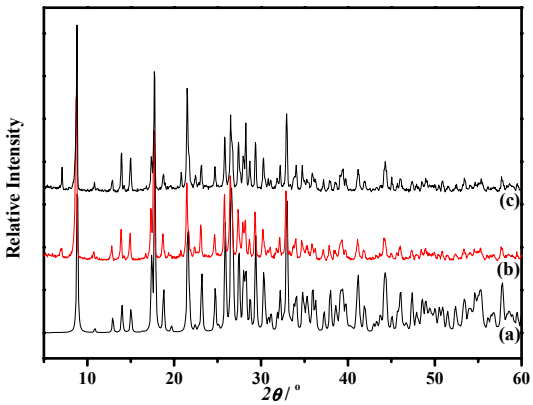

Fig. S6 The XRD patterns of **1** (a) simulated from X-ray single crystal data, (b) polycrystalline as newly synthesized, and (c) polycrystalline annealed at 250 °C.

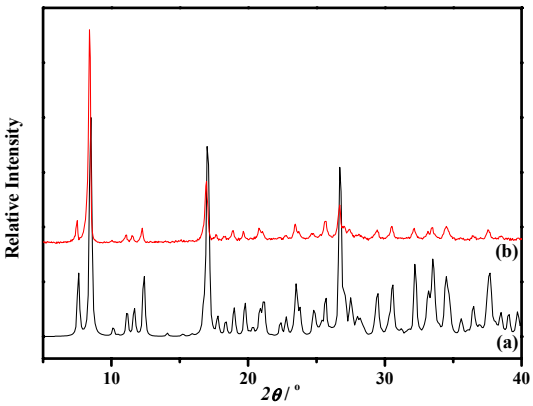

Fig. S7 The XRD patterns of **2** (a) simulated from X-ray single crystal data, and (b) polycrystalline as newly synthesized.

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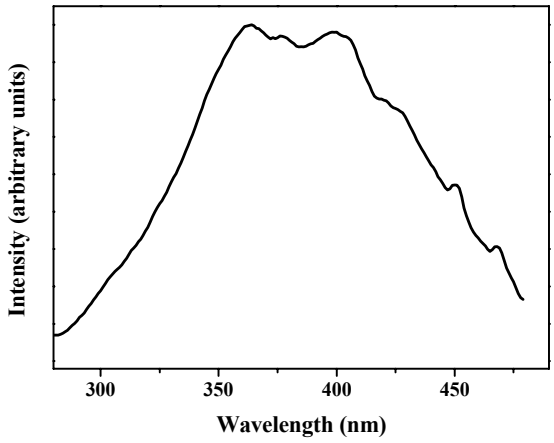

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Fig. S8 Normalized fluorescent emission spectrum of $[Co(LH_2)(H_2O)]$.

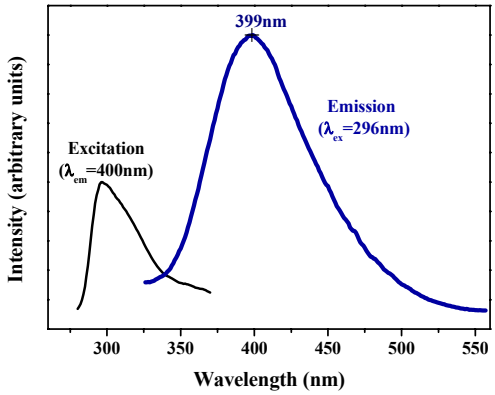

Fig. S9 Normalized fluorescent emission and excitation spectra for $[(C_5H_4N)CH_2CH(OH)(PO_3H_2)_2]\cdot H_2O$.

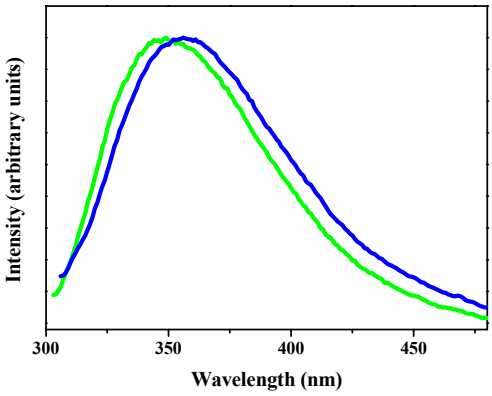

Fig. **S10** Normalized fluorescent emission spectra of as-prepared **1** (blue) and **1-250** (green).

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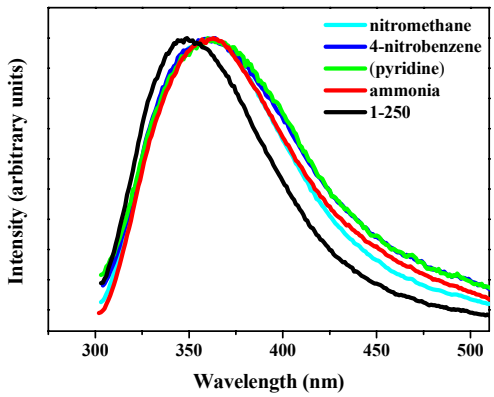

Fig. **S11** Normalized fluorescent emission spectra of **1-250**, as well as solid **1-250** has been exposed to nitromethane, 4-nitrotolune, pyridine and ammonia.

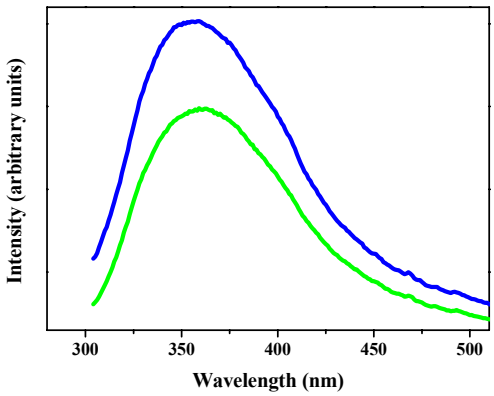

Fig. **S12** Relative intensities of emission for solid **1-250** which has been exposed to the equilibrated vapors of a mixture of 2.5mmol nitrobenzene with 2.30ml water for 3 days (green), as well as briefly heating with infrared lamp for about 30 minutes (blue).