

**Pillared-layered indium phosphites templated by amino acids:
isorecticular structures, water stability, and fluorescence**

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Physical measurements:

Powder X-ray diffraction (XRD) data were obtained using a Rigaku D/MAX-rA diffractometer with Cu-K α radiation ($\lambda = 1.5418 \text{ \AA}$). The elemental analysis was carried out on an Elementar Vario EL III analyzer. IR spectra (KBr pellets) were recorded on a Nicolet Impact 410 FTIR spectrometer. The thermogravimetric analyses were performed on a Netzsch STA 449c analyzer in a flow of N₂ with a heating rate of 10 °C/min. The fluorescent spectrum was collected on a FS5 Spectrofluorometer (Edinburgh instruments) equipped with a 150 W CW Ozone-free xenon arc lamp. Alternating current impedance measurements were carried out with a Solartron SI 1260 impedance/gain-phase analyzer over the frequency range from 0.1 Hz to 32 MHz with an applied voltage of 10 mV. The relative humidity was controlled by a STIK Corp. CIHI-150B incubator. The sample was pressed to form a cylindrical pellet of crystalline powder sample (~2 mm thickness \times 5 mm ϕ) coated with C-pressed electrodes. Two silver electrodes were attached to both sides of pellet to form four end terminals (quasi-four-probe method). Single crystal X-ray diffraction data were collected on a New Gemini, Dual, Cu at zero, EosS2 diffractometer at room temperature. The crystal structures were solved by direct methods. The structures were refined on F^2 by full-matrix least-squares methods using the *SHELXTL* program package.¹

Reference

1. G. M. Sheldrick, Acta Cryst., Sect. A, 2008, 64, 112.

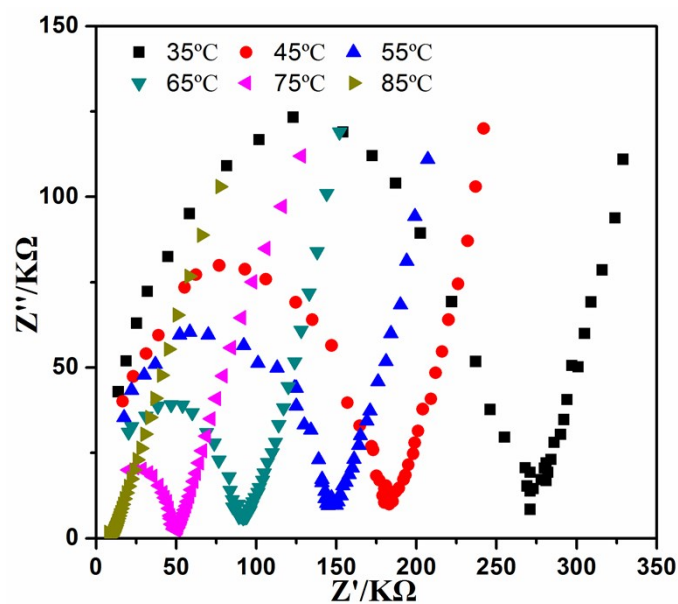


Fig. S1. Nyquist plots of SCU-31 at different temperature under 95% RH. The conductivity is $7.1 \times 10^{-6} \text{ S}\cdot\text{cm}^{-1}$ at 35 °C, $1.0 \times 10^{-5} \text{ S}\cdot\text{cm}^{-1}$ at 45 °C, $1.3 \times 10^{-5} \text{ S}\cdot\text{cm}^{-1}$ at 55 °C, $2.1 \times 10^{-5} \text{ S}\cdot\text{cm}^{-1}$ at 65 °C, $3.8 \times 10^{-5} \text{ S}\cdot\text{cm}^{-1}$ at 75 °C, and $2.2 \times 10^{-4} \text{ S}\cdot\text{cm}^{-1}$ at 85 °C.

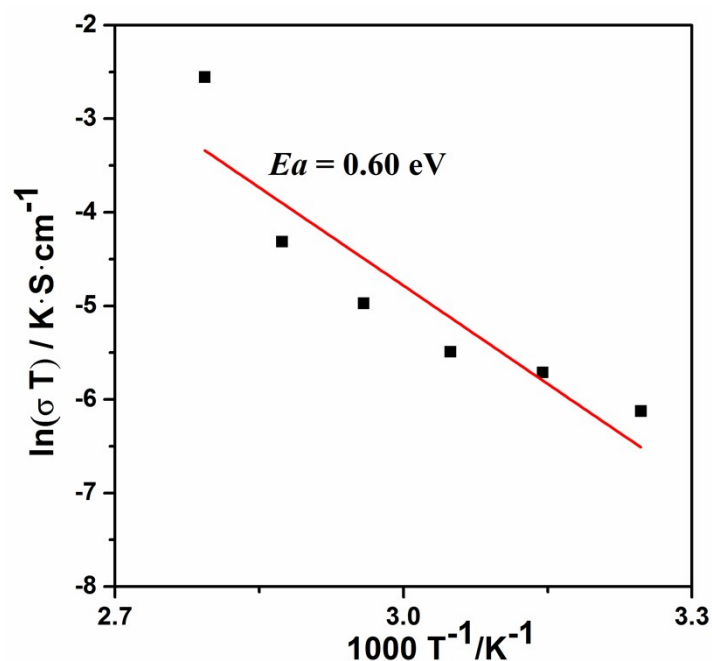


Fig. S2. Arrhenius plot of the proton conductivity of SCU-31 under 95% RH.

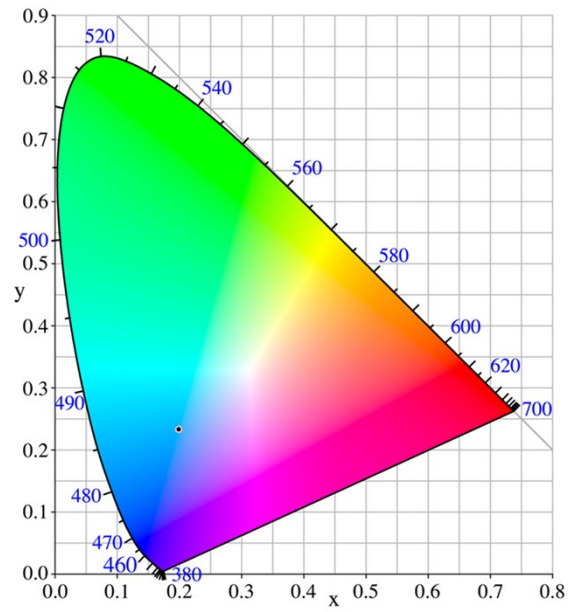


Fig. S3. The CIE coordinates for the powder sample of SCU-31 (0.1984, 0.2328).

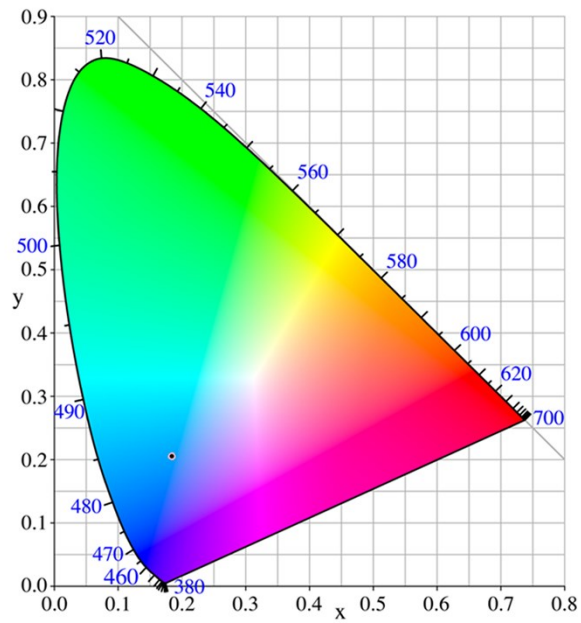


Fig. S4. The CIE coordinates for the powder sample of SCU-32 (0.1842, 0.2050).

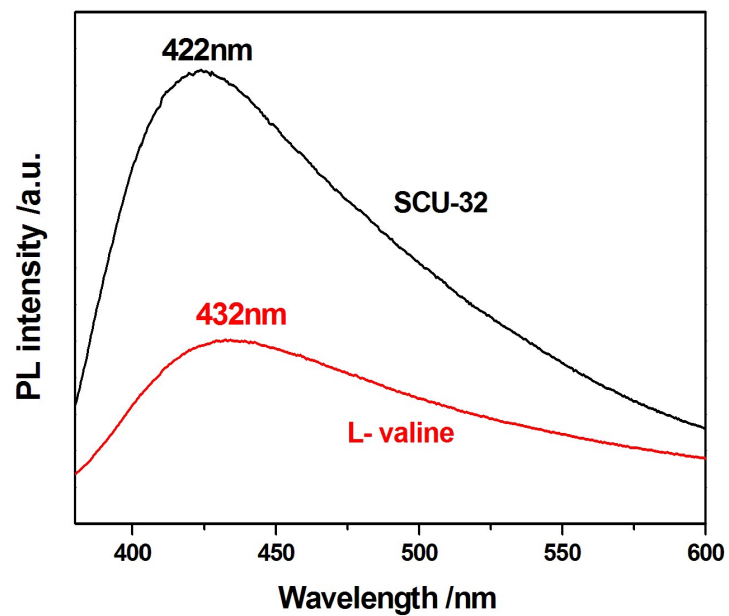


Fig. S5. The photoluminescent spectra of SCU-32 and L-valine.

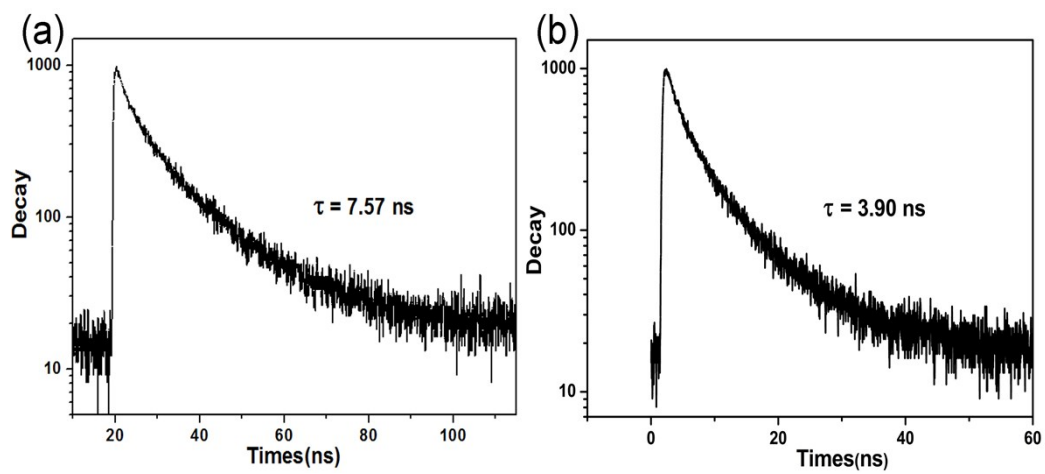


Fig. S6. The lifetime of (a) SCU-31 and (b) SCU-32.

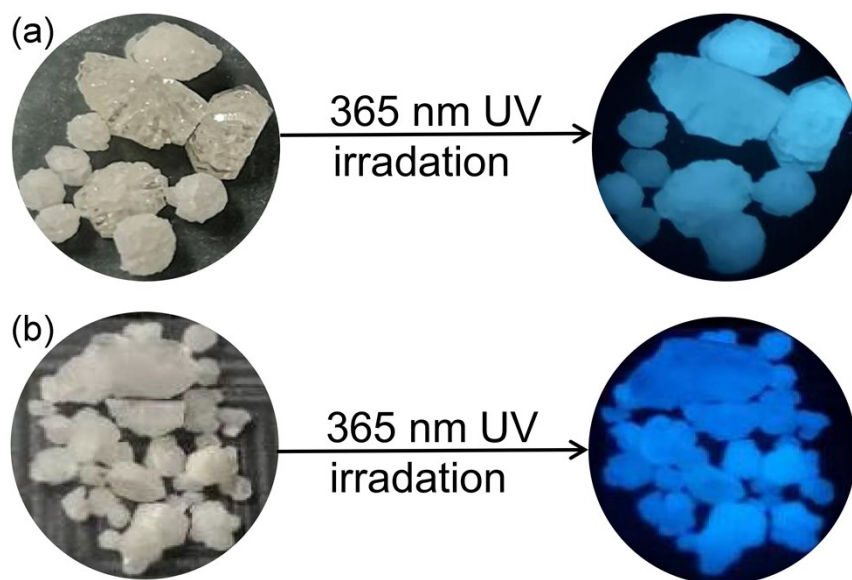


Fig. S7. Photos of (a) SCU-31 and (b) SCU-32 under exposure of portable UV lamp.

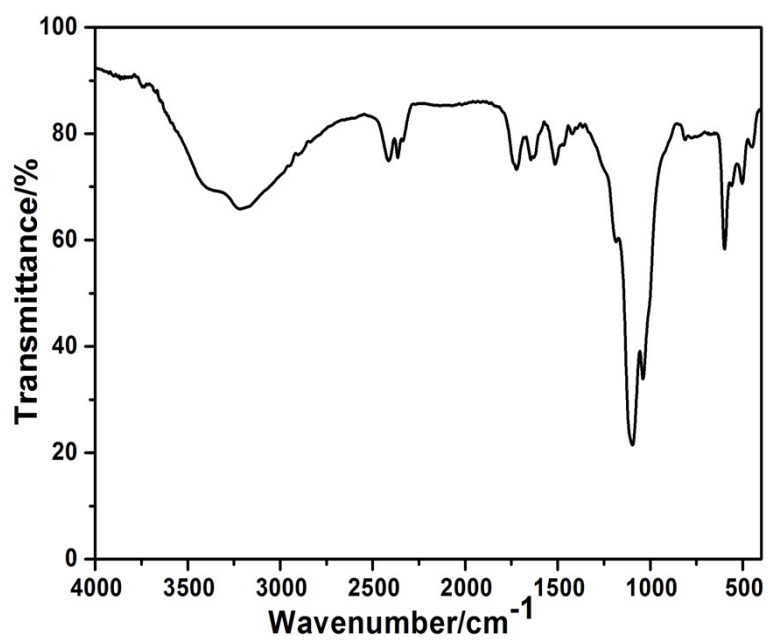


Fig. S8. IR spectrum of SCU-31.

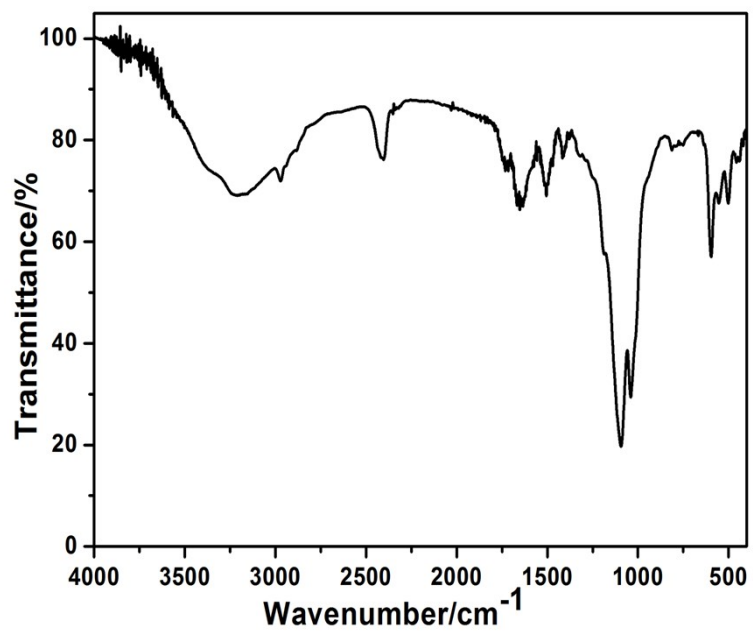


Fig. S9. IR spectrum of SCU-32.

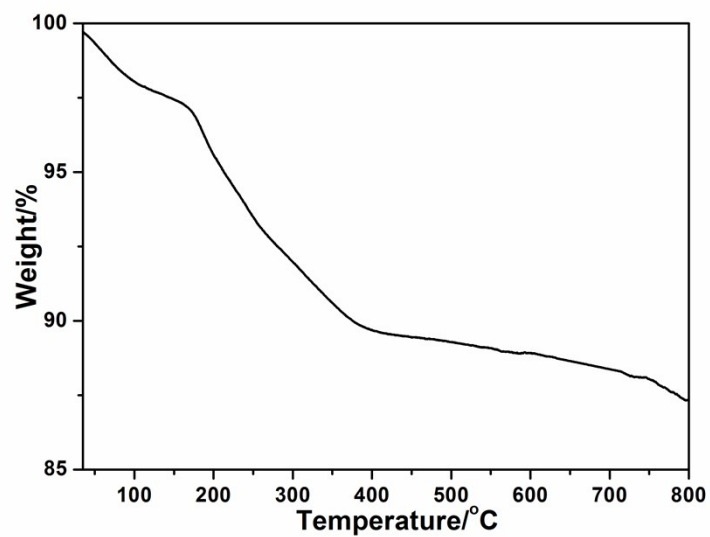


Fig. S10. TGA curve of SCU-31.

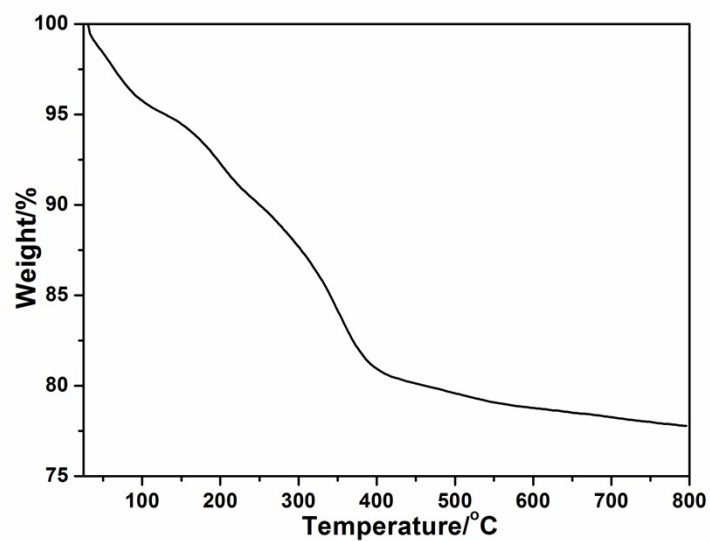


Fig. S11. TGA curve of SCU-32.

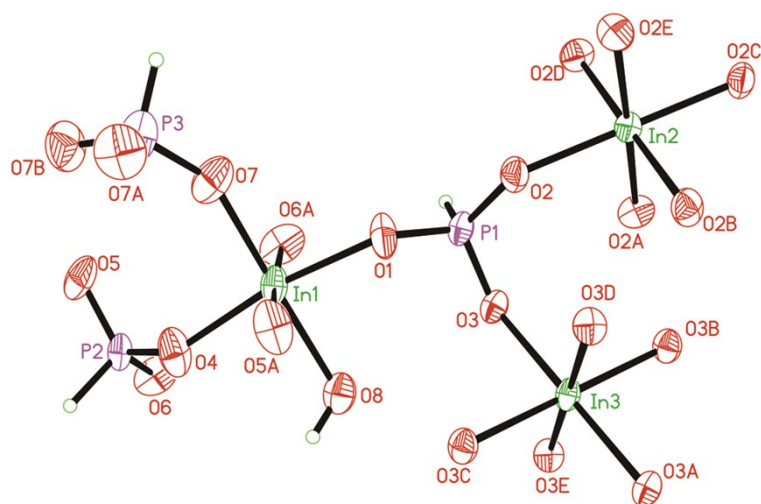


Fig. S12. View of the coordination environments for In and P in the asymmetric unit of SCU-31, showing the atom-labeling scheme and 50% thermal ellipsoids. Atom labels having “A”, “B”, “C”, “D” and “E”, refer to symmetry-generated atoms.

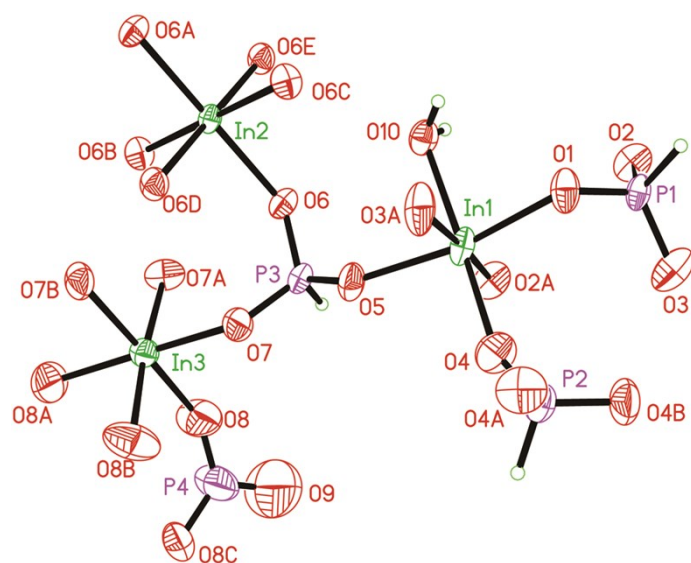


Fig. S13. View of the coordination environments for In and P in the asymmetric unit of SCU-32, showing the atom-labeling scheme and 50% thermal ellipsoids. Atom labels having “A”, “B”, “C”, “D” and “E”, refer to symmetry-generated atoms.

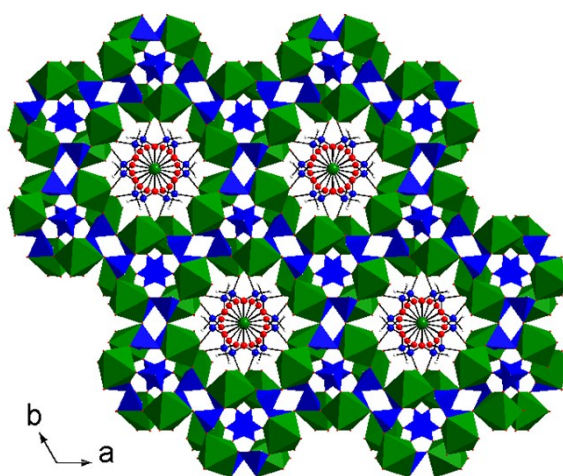


Fig. S14. A view of the structure of SCU-31 along the [001] direction.

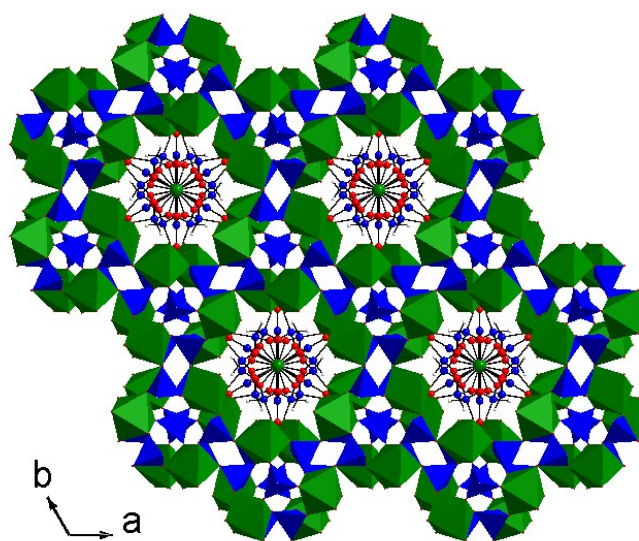


Fig. S15. A view of the structure of SCU-32 along the [001] direction.

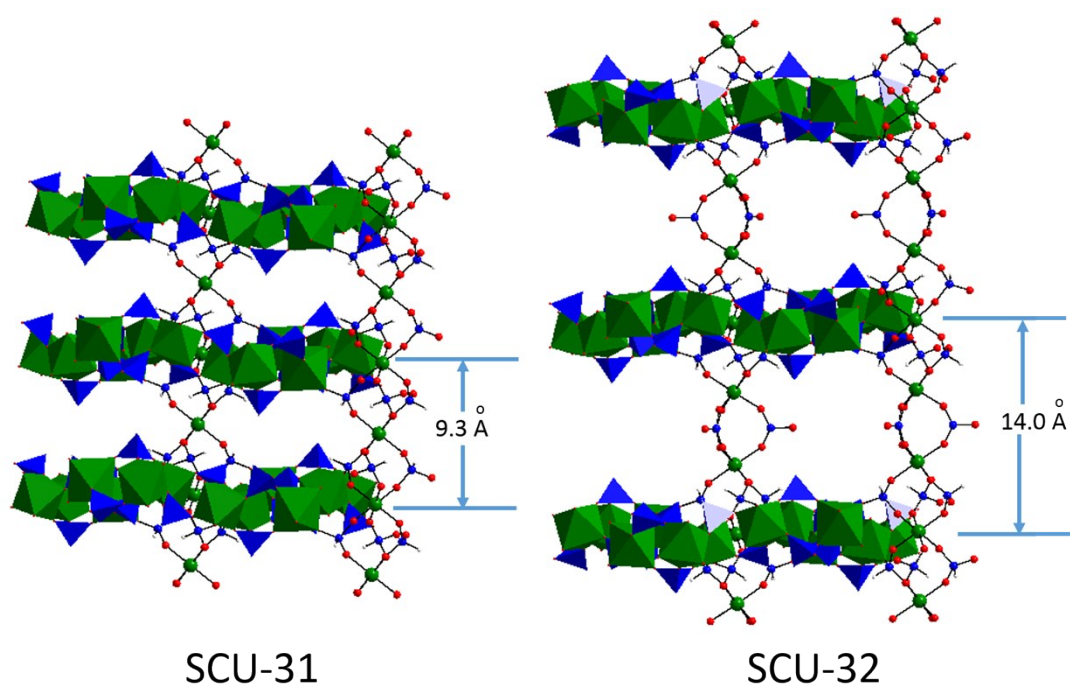


Fig. S16. Comparison of the lengths of inorganic pillars between two adjacent layers in SCU-31 and SCU-32.