

Electronic supporting information

Water assisted high proton conductance in a highly thermal and superior water-stable open-framework cobalt phosphate

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Contents

Figure S1: Photos of crystals of (a) sample-**a**, (b) sample-**b**, (c) sample-**c**, (d) sample-**d**.

Figure S2: PXRD patterns for the sample-**a**, **b**, **c** and **d** as well as the simulated PXRD pattern of **1**.

Figure S3: TG curves of sample-**b**, **c**, **d**.

Figure S4: Shorter interatomic distances between N atoms and O atoms in the crystal of **1** (where $d_1 = 3.011$, $d_2 = 3.317$, $d_3 = 2.799$, $d_4 = 2.8621$, $d_5 = 2.715$, $d_6 = 3.073$, $d_7 = 3.033$, $d_8 = 2.840$ and $d_9 = 2.988$ Å).

Figure S5: Reduplicative AC impedance spectra analysis under 98%RH of $(C_2N_2H_{10})_{0.5}CoPO_4$ (The compressed pellet with 7 mm in diameter and 2.42 mm in thickness).

Figure S6: Nyquist plots of **1**, and the impedance data were obtained for the sample which was kept at 329 K and 98% relative humidity for (a) one and (b) two days, respectively.

Figure S7: (a-c) AC impedance spectra and (d, e) conductivity analysis at the selected temperatures under 98%RH for sample-**b**

Figure S8: Nyquist plots of **1** under anhydrous condition at selected temperatures.

Figure S9: (a, b) Water adsorption isotherms at 298 K of different synthesizing batches of samples.

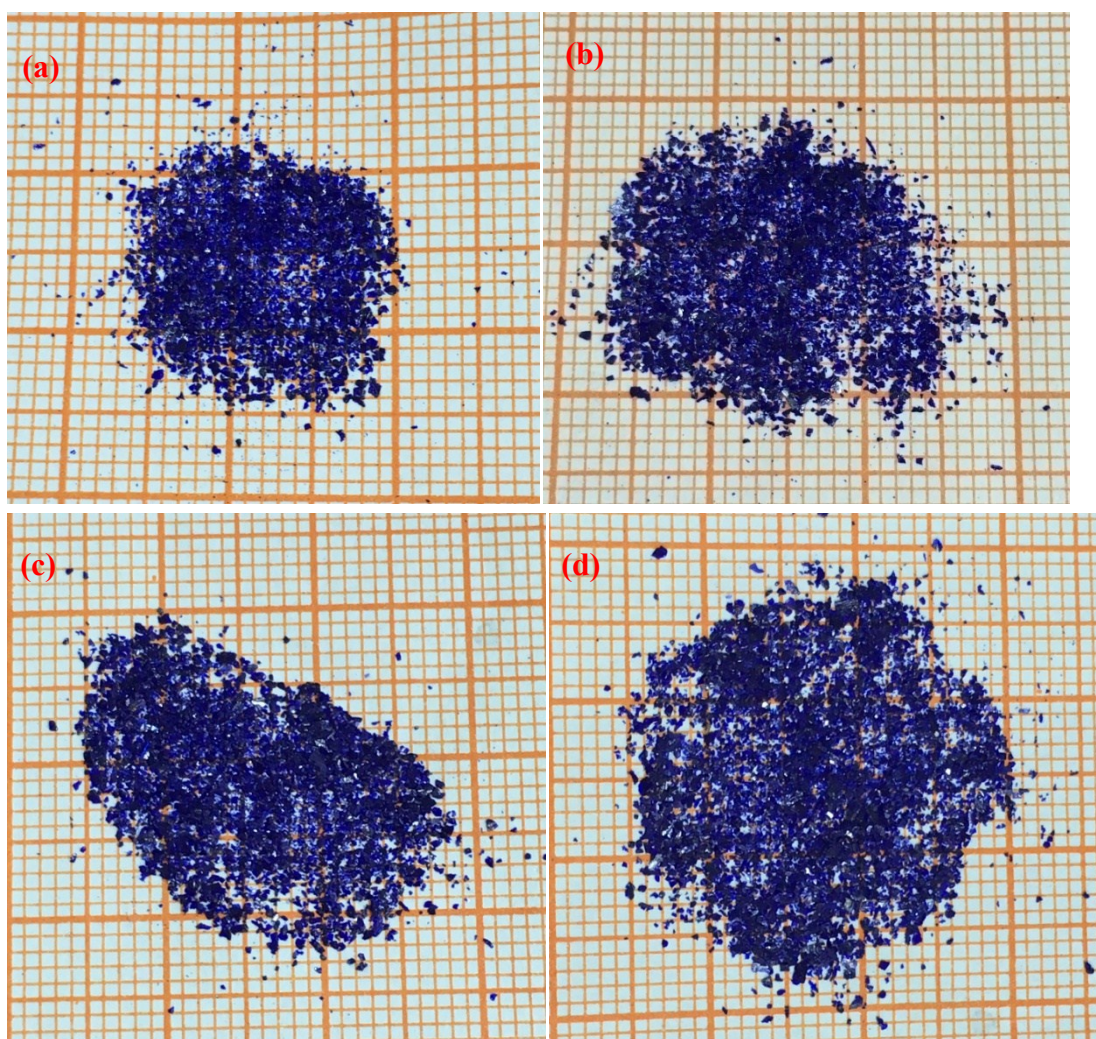


Figure S1: Photos of crystals of (a) sample-**a**, (b) sample-**b**, (c) sample-**c**, (d) sample-**d**.

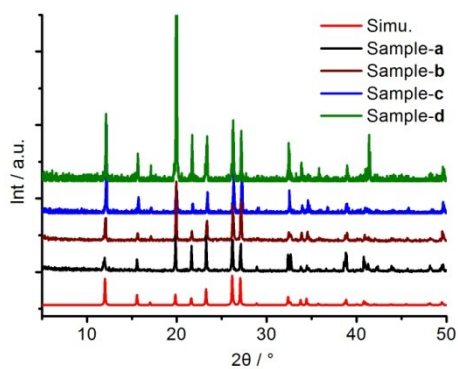


Figure S2: PXRD patterns for the sample-a, b, c and d as well as the simulated PXRD pattern of **1**.

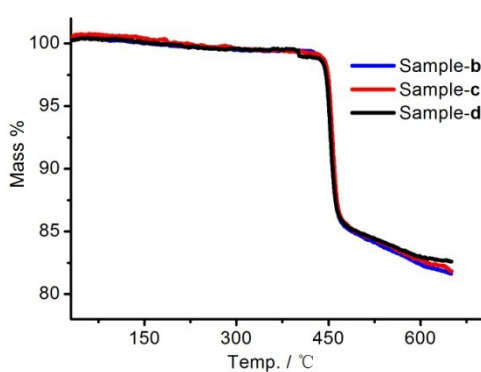


Figure S3: TG curves of sample-b, c, d.

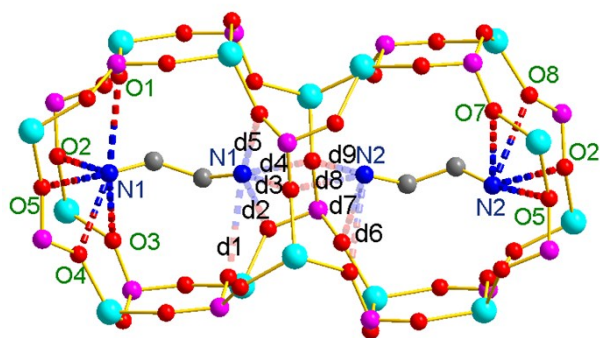


Figure S4: Shorter interatomic distances between N atoms and O atoms in the crystal of **1** (where d1 = 3.011, d2 = 3.317, d3 = 2.799, d4 = 2.8621, d5 = 2.715, d6 = 3.073, d7 = 3.033, d8 = 2.840 and d9 = 2.988 Å).

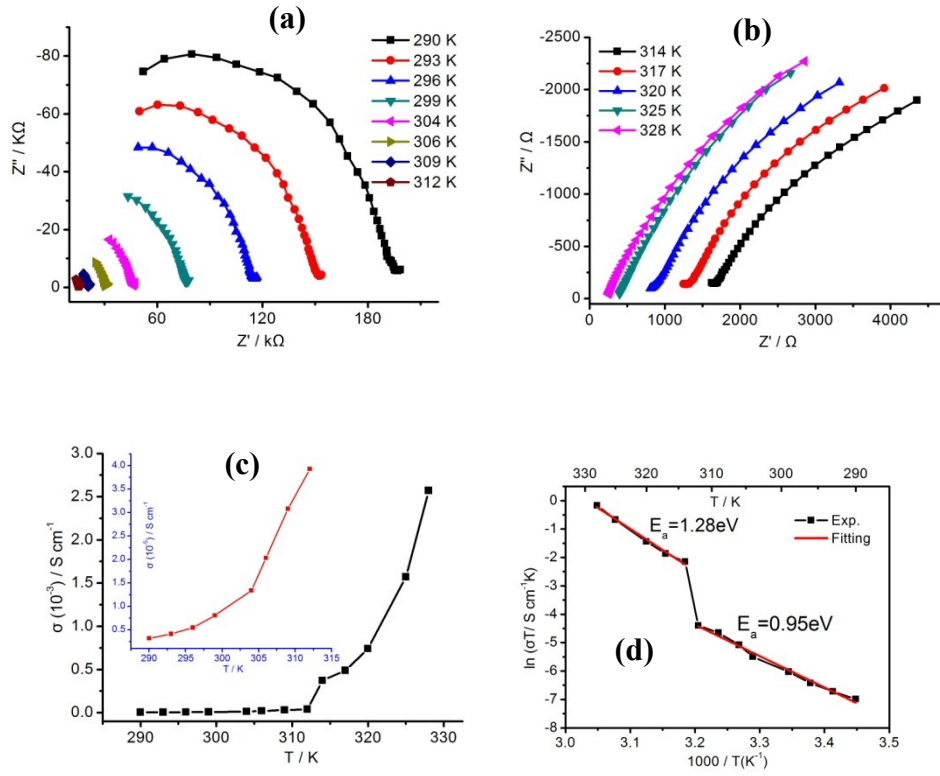


Figure S5: Reduplicative AC impedance spectra analysis under 98%RH of $(\text{C}_2\text{N}_2\text{H}_{10})_{0.5}\text{CoPO}_4$ (The compressed pellet with 7 mm in diameter and 2.42 mm in thickness).

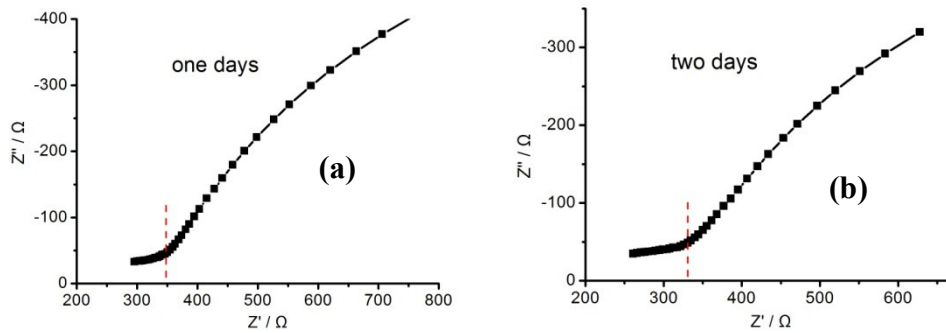


Figure S6: Nyquist plots of **1**, and the impedance data were obtained for the sample which was kept at 329 K and 98% relative humidity for (a) one and (b) two days, respectively.

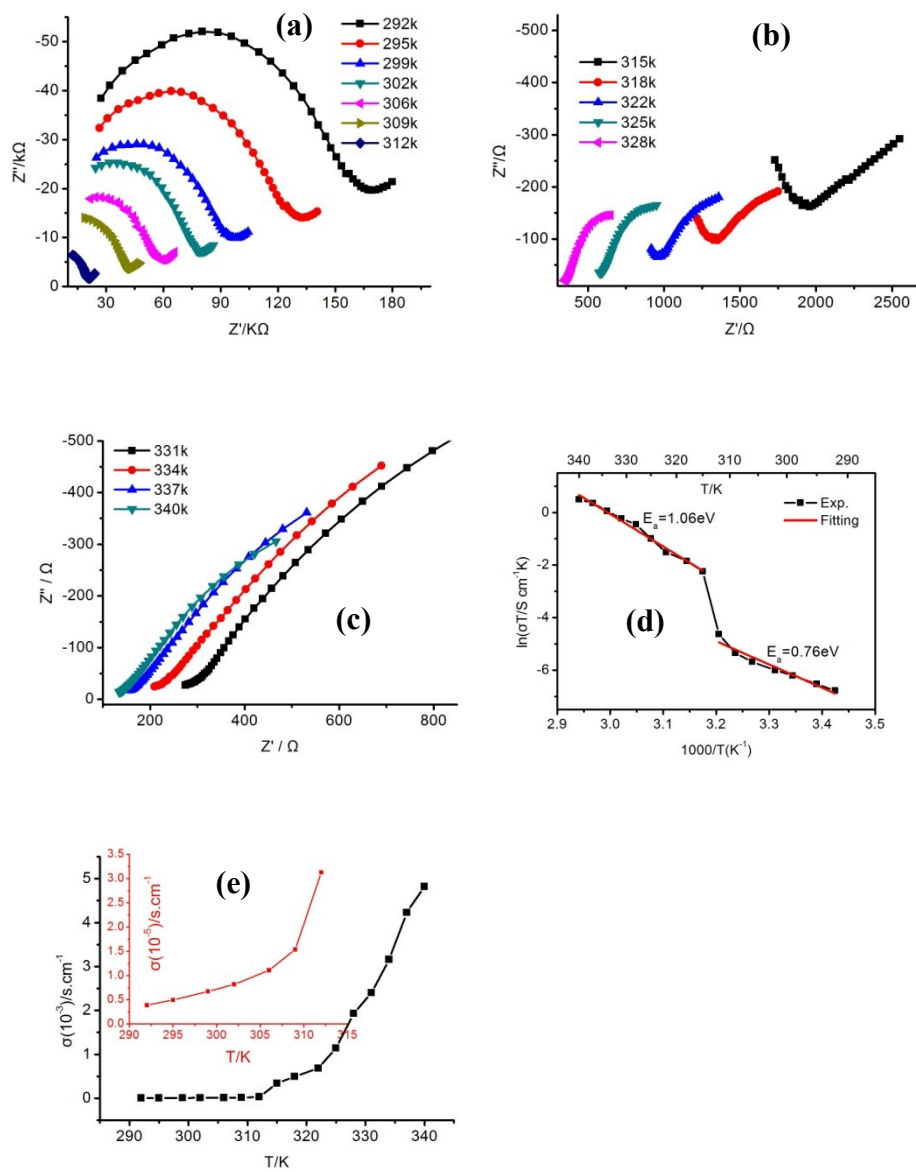


Figure S7: (a-c) AC impedance spectra and (d, e) conductivity analysis at the selected temperatures under 98%RH for sample-d

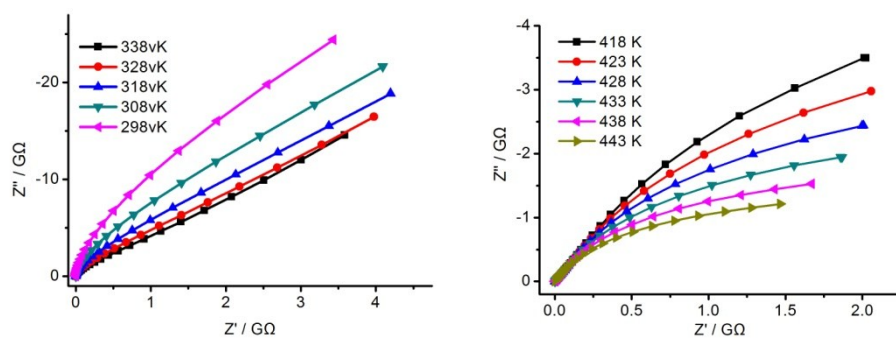


Figure S8: Nyquist plots of **1** under anhydrous condition at selected temperatures.

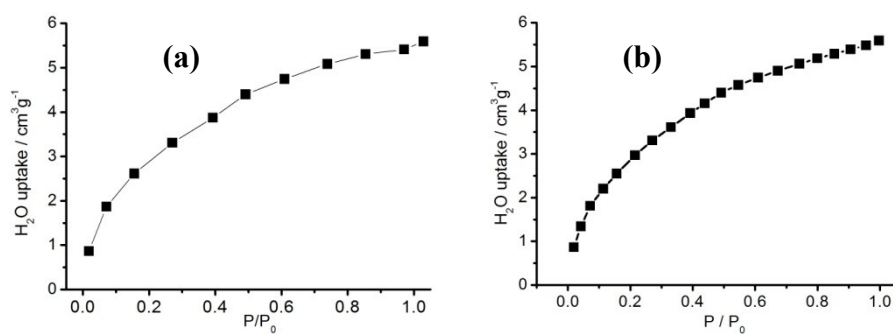


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