Improving proton conduction of Prussian blue analogue Cu₃[Co(CN)₆]₂·nH₂O at low humidity by forming hydrogel composite

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Figure S1. PXRD patterns of the samples of CuHCC, Im@CuHCC and Im-HAc@CuHCC used for impedance measurements.



Figure S2. Photograph of concreting solution for (a) pure PVA (b) Im-HAc@CuHCC-PVA-10 and (c) as-synthesized Im-HAc@CuHCC-PVA-10.



Figure S3. SEM images of cross-section of Im-HAc@CuHCC-PVA-X, X = (a) 0% (b) 2% (c) 5% (d) 10%.



Figure S4. IR spectra of CuHCC, Im@CuHCC and Im-HAc@CuHCC.



Figure S5. IR spectra of Imidazole, Im@CuHCC and Im-HAc@CuHCC.



Figure S6. Schematic illustration of the crystal structure of CuHCC with vacancies.



Figure S7. Pore size distribution of CuHCC, showing the main pores with a diameter of ~0.8 nm, which correspond to the cubic pores surround by twelve Co–C=N–Cu edges, and other bigger pores with a diameter of ~1.6 and ~2.0 nm, which correspond to the vacancy sites.



Figure S8. Nyquist plots of CuHCC in (a) N_2 atmosphere and (b) under 98% RH; Im@CuHCC in (c) N_2 atmosphere (d) under 98% RH and (e) Plots of σ vs. T of CuHCC, Im@CuHCC and Im-HAc@CuHCC under N_2 atmosphere.



Figure S9. Nyquist plots of (a) CuHCC (b) Im@CuHCC (c) Im-HAc@CuHCC in the environment humidity (25% RH) and (d) plots of conductivity against temperature for CuHCC, Im@CuHCC and Im-HAc@CuHCC.



Figure S10. The equivalent circuit used for impedance spectroscopy analysis in this study.



Figure S11. Experimental and the reproduced Nyquist plots used the parameters, which are obtained from the equivalent circuit analysis, at the selected temperatures under N_2 atmosphere for (a) CuHCC, (b) Im@CuHCC and (c) Im-HAc@CuHCC.



Figure S12. Experimental and the reproduced Nyquist plots used the parameters, which are obtained from the equivalent circuit analysis, at the selected temperatures and 25% RH for CuHCC.



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