Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Porous CuO microspheres architectures as high-performance cathode materials for aluminum-ion battery

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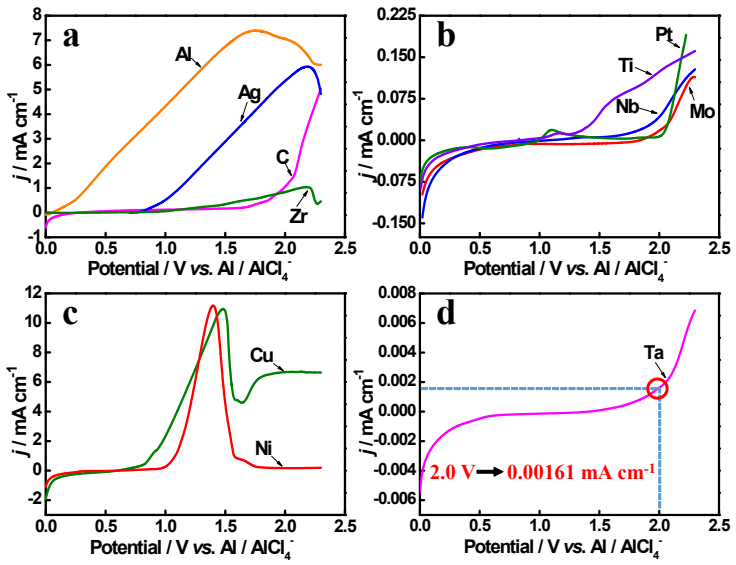

Fig. S1 The polarization curves of various metallic and non-metallic current collectors in the $AlCl_3$/[EMIm]Cl ionic liquid electrolyte system. (a) Al, Ag, C and Zr. (b) Pt, Ti, Nb and Mo. (c) Cu and Ni. (d) Ta.

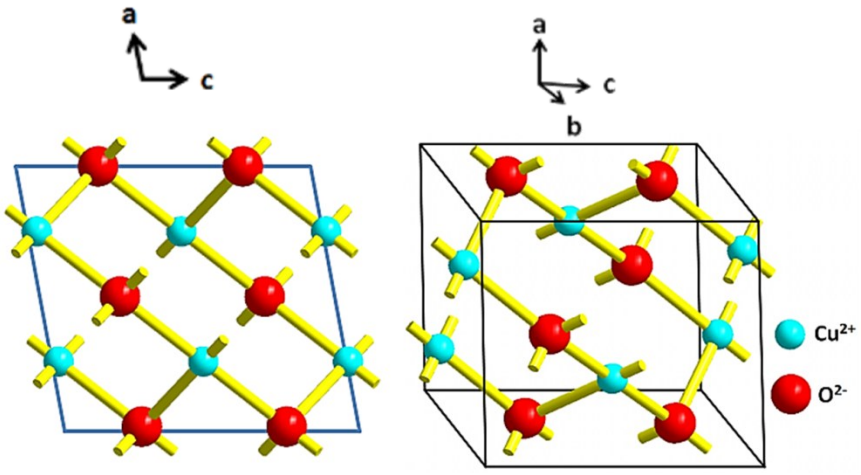

Fig. S2 The atomic structures of PM-CuO from two different perspectives.

Table S1. The element content of PMs-CuO cathode material.

Element	Atomic %
Cu	40.49
O	36.61
C	21.83
Au	1.07

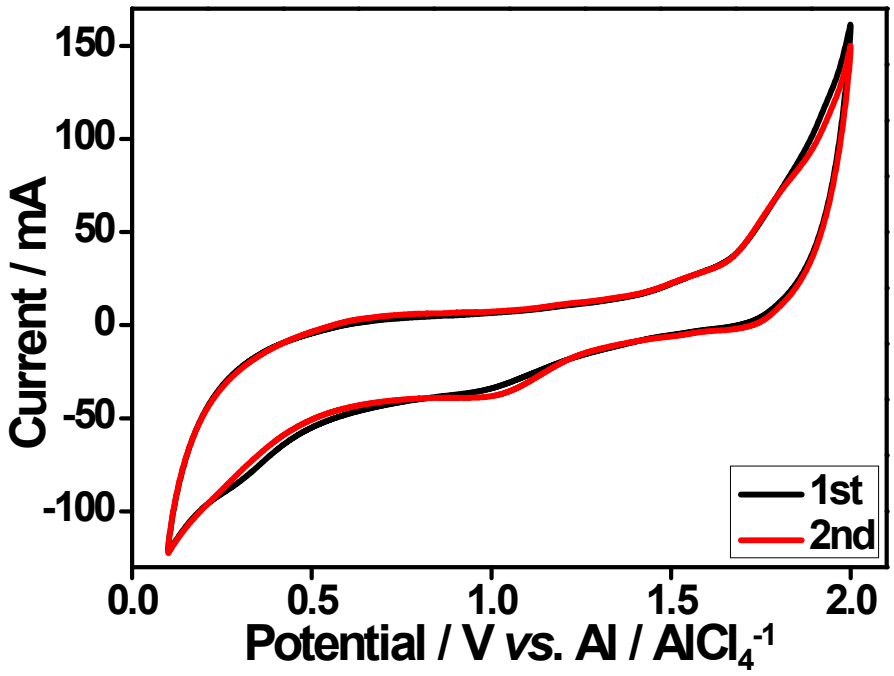

Fig. S3 The typical CV curves of Al-Ta (cathode-Ta, anode-Al) performed in the voltage range of 0.1~2.0 V *vs.* $Al/AlCl_4^-$ at a scan rate of 1.0 mV s^{-1}.

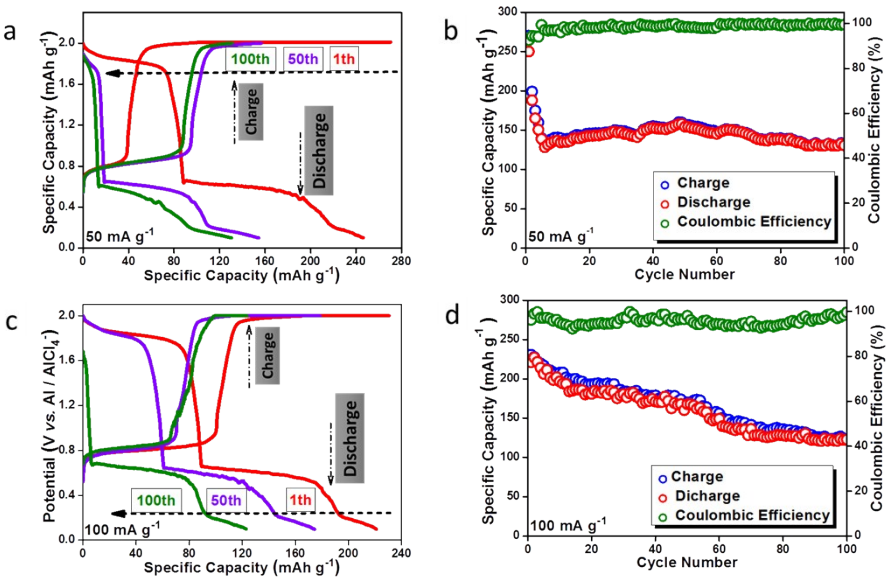

Fig. S4 (a,b) The charge/discharge curves at the current densities of 50 and 100 mA g^{-1} from 1^{st} to 100^{st}, respectively. (c,d) The cycling performance at 50 and 100 mA g^{-1}.

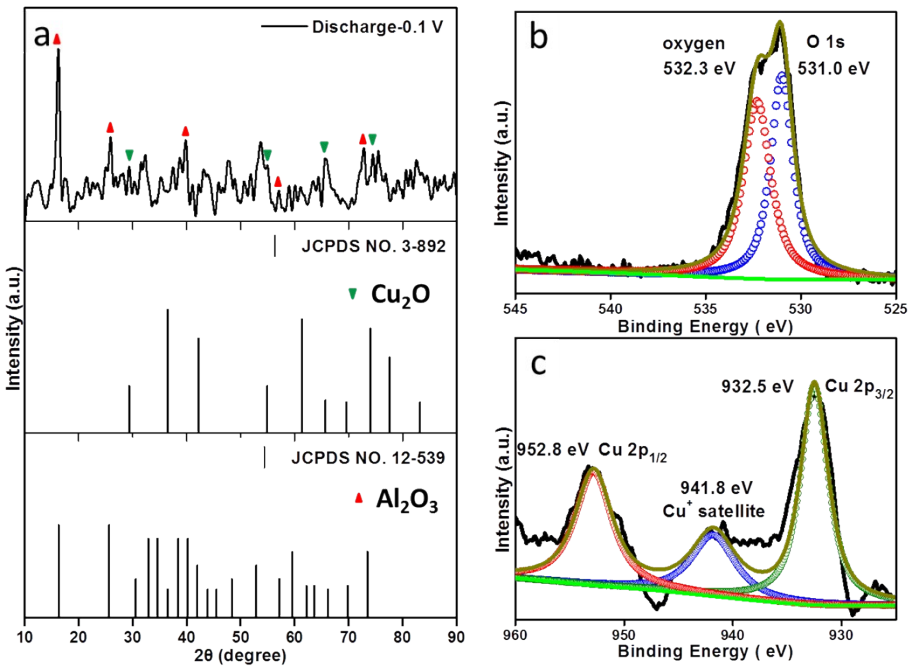

Fig. S5 The XPS and XRD measurements of the cathode materials after 10 cycles after fully discharged to 0.1 V. (a) XRD pattern of the cathode. (b,c) XPS signals of Cu 2p and O 1s.

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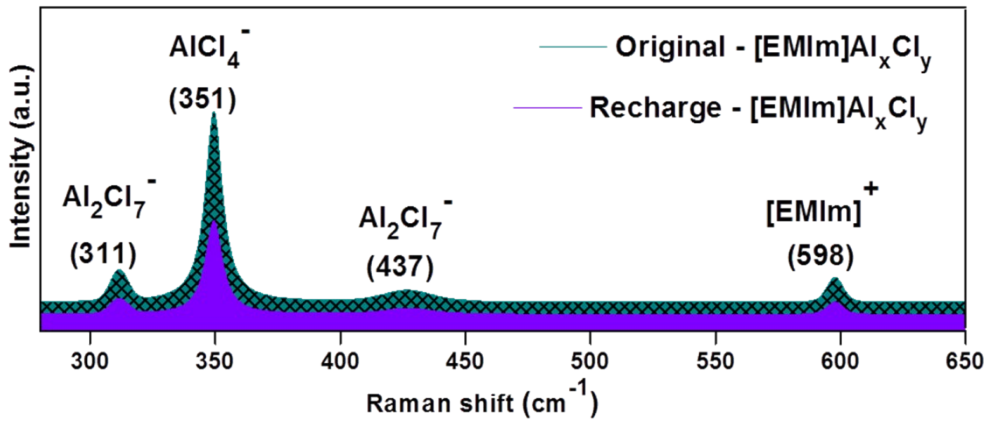

Fig. S6 Raman spectra of the $AlCl_3$/[EMIm]Cl ionic liquid electrolytes with a mole ration of $AlCl_3$/[EMIm]Cl=1.3 in different states.

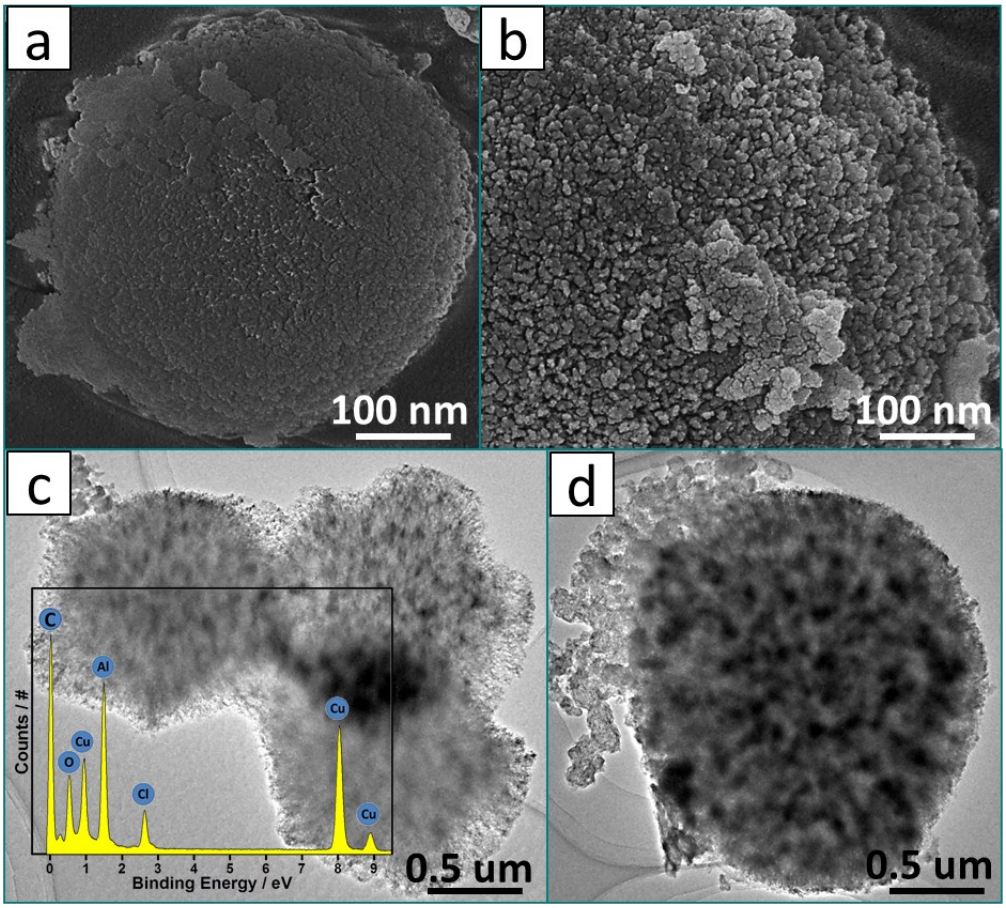

Fig. S7 (a,b) SEM, and (c,d) TEM images of the PM-CuO after 100 cycles.