Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting information

Rechargeable Mg-M (M = Li, Na and K) dual-metal-ion batteries based on Berlin green cathode and metallic Mg anode

Yujie Zhang[a], Jingwei Shen[a], Xue Li[a], Zhongxue Chen[a], Shun-an Cao[a],

Ting Li*[b], Fei Xu*[a]

[a] Key Laboratory of Hydraulic Machinery Transients, Ministry of Education, School of Power and Mechanical Engineering, Wuhan University, Wuhan 430072, China.

[b] Key Laboratory of Catalysis and Materials Science of the State Ethnic Affairs Commission & Ministry of Education, College of Chemistry and Materials Science, South-Central University for Nationalities, Wuhan 430074, China.

*Correspondence:

Fei Xu (xufei2058@whu.edu.cn)

Ting Li (liting@mail.scuec.edu.cn)

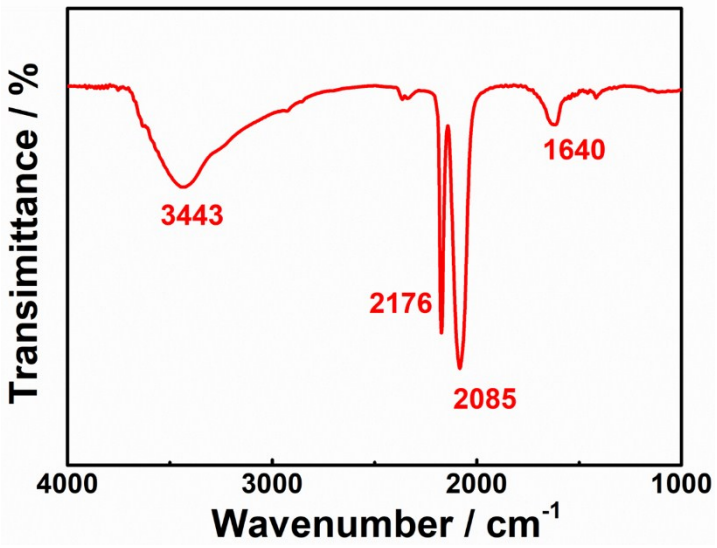

Fig. S1 FT-IR spectra of the $FeFe(CN)_6$ sample.

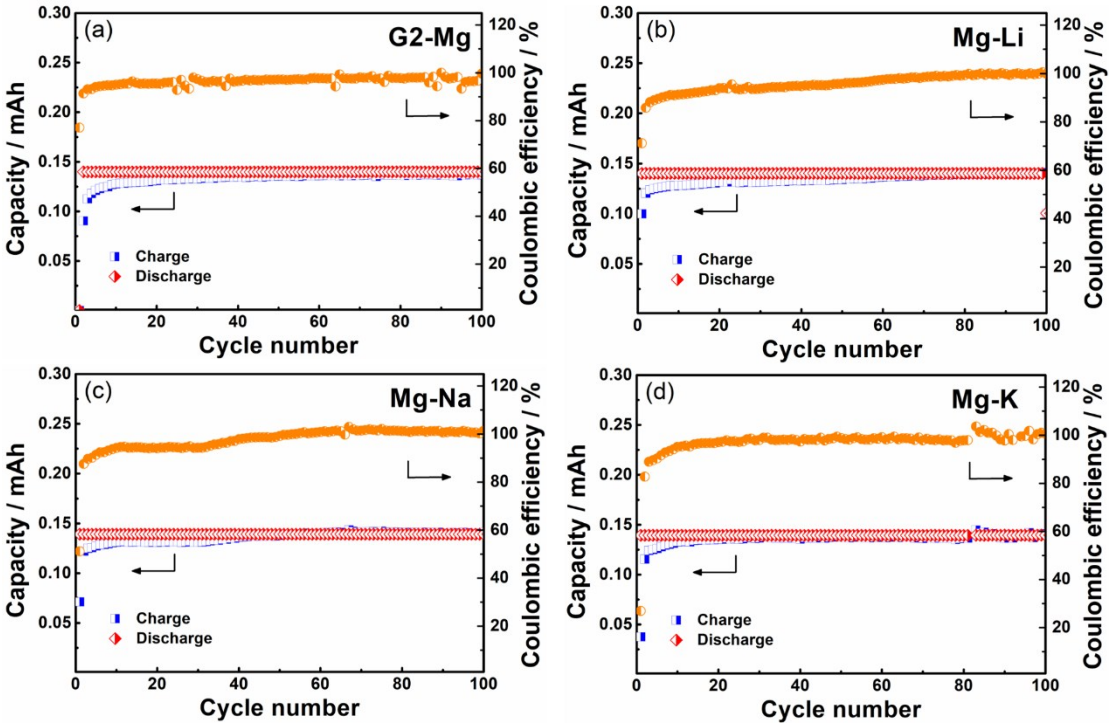

Fig. S2 Cycling efficiencies of Mg deposition/dissolution in (a) Mg^{2+}, (b) Mg^{2+}/Li^{+}, (c) Mg^{2+}/Na^{+} and (d) Mg^{2+}/K^{+} electrolytes.

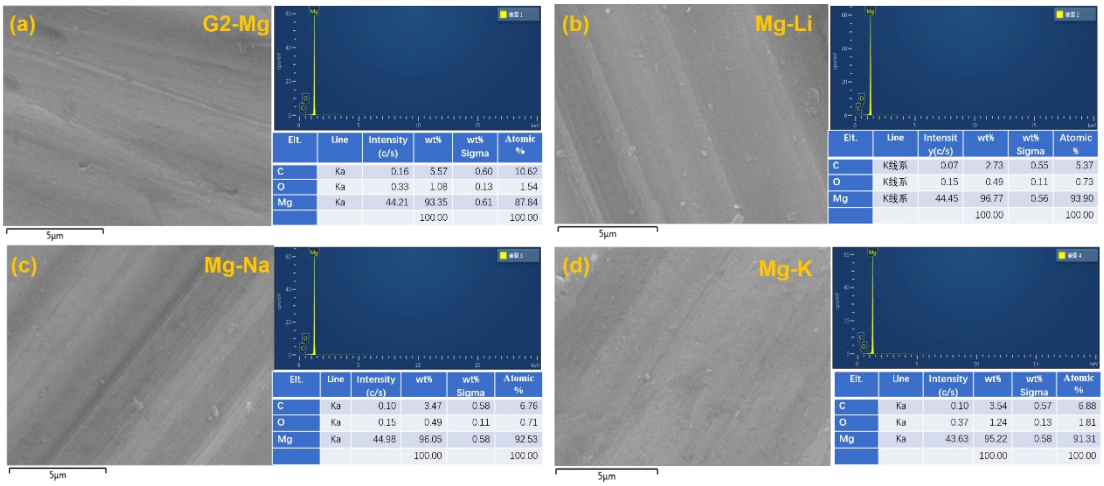

Fig. S3 SEM images and corresponding EDS spectra of of Mg foils after 20 cycles in (a) Mg-HMDS, (b) Mg-Li, (c) Mg-Na and (d) Mg-K electrolytes.

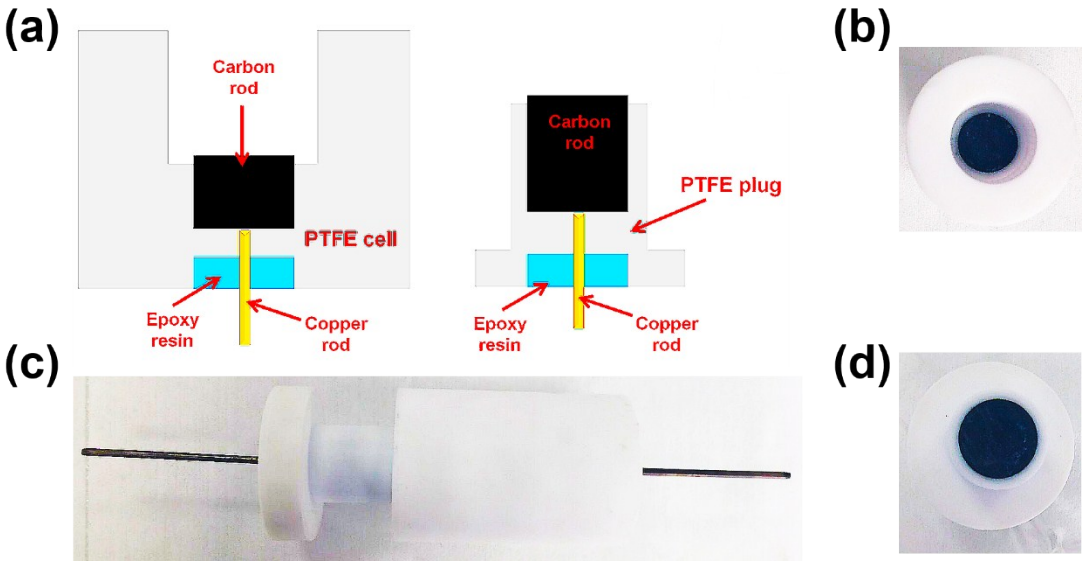

Fig. S4 (a) Schematic drawing and (b, c, d) photos of the lab-made PTFE cell for Mg battery tests. The cell is made of customer-designed PTFE cell body and carbon rod electrode (with a copper rod inserted in). Epoxy resin is used to fix the carbon electrode and seal the crack. PTFE tape is used for the sealing during the Mg cell fabrication.

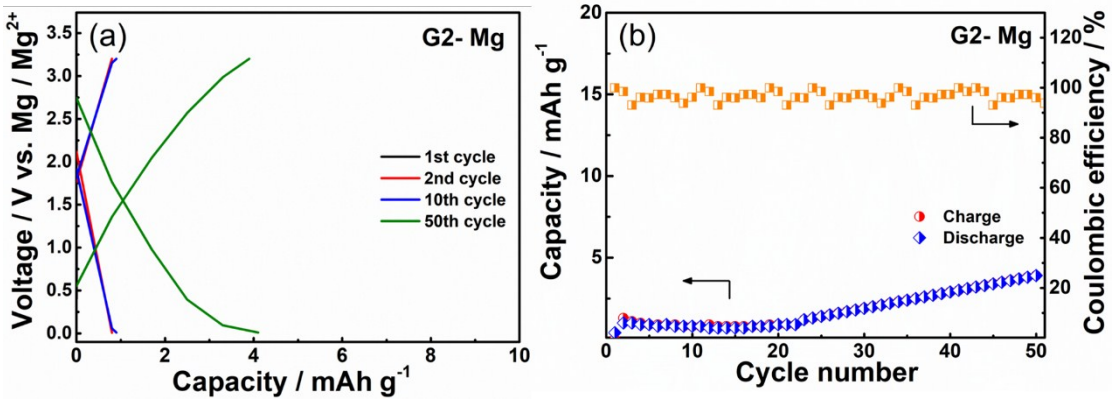

Fig. S5 (a) Discharge/charge profiles of $FeFe(CN)_6$ electrode in Mg^{2+} electrolyte at a current density of 50 mA g^{-1} and (b) corresponding cycling performance for the initial 50 cycles.