Confine Sulfur in Mesoporous Chromium-Metal–Organic Frameworks (MIL-101) for Long-life Lithium–Sulfur Batteries

Wenxiao Su², Wangjun Feng^{1,2,*}, Guangjie Gao², Lijing Chen², Miaomiao Li, Changkun Song²,

¹ State Key Laboratory of Advanced Processing and Recycling Nonferrous Metals, Lanzhou University of Technology, Lanzhou 730050, China;

² School of Science, Lanzhou University of Technology, Lanzhou 730050, China)

*E-mail: wjfeng@lut.cn

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Large surface area and mesoporous Chromium-Metal–Organic Frameworks (MIL-101(Cr)) have been prepared as a sulfur host for long-life Li-S batteries. The MIL-101(Cr)/S cathode exhibits excellent electrochemical performance, high initial discharge capacity of 1210.5 mAh g⁻¹ at 0.1 C and a retentive capacity of 60.1% after 400 cycles at 0.2 C. Especially, the capacity contributed by the first platform of the discharge is only attenuated by 66.71 mA g⁻¹ at the current density of from 0.1C increasing to 0.5C, which means that MIL-101(Cr)/S can obviously inhibit the occurrence of the shuttle effect. Experimental results indicate that the MIL-101(Cr) is a potential host material for the long-life and high performance lithium–sulfur batteries.

Keywords: MIL-101(Cr); Lithium-sulfur battery; Sulfur cathode; Shuttle effect.

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