

# Surface Modification of Lithium Metal Electrode in Na-containing SO<sub>2</sub> Inorganic Electrolyte for Rechargeable Li-SO<sub>2</sub> battery

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According to demand for large-scale energy storage system, lithium metal has attracted much attention as an anode material because of the lowest operating voltage and high theoretical capacity. However, dendritic growth of Li, low Coulombic efficiency and chemical reaction with the electrolyte during cycling have hindered its practical application. Herein, we report that Na-containing SO<sub>2</sub> inorganic electrolyte enables highly stable solid electrolyte interphase formation on the Li metal anode as well as dendrite-free Li electrodeposition even under severe condition of high areal capacity (5 mA h/cm<sup>2</sup>) with current density (3 mA/cm<sup>2</sup>). In addition, surface-treated Li metal anode immersed in NaAlCl<sub>4</sub>-2SO<sub>2</sub> electrolyte leads to improved electrochemical performance compared to non-treated one. Surface modification with NaAlCl<sub>4</sub>-2SO<sub>2</sub> electrolyte plays an important role in providing mechanically and chemically stable surface film on Li metal anode for room-temperature Li metal-based rechargeable batteries. In the presentation, the electrochemical performance and morphological behavior of surface-modified Li metal anode will be discussed in more detail.