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Design, fabrication and nano-scale characterization of novel SEI layers

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Lithium has a high specific capacity of 3860 mAh g−1 and a low electrochemical potential (-3.04 V), promising a high energy density lithium metal battery (LMB). However, the growth of lithium dendrites during charging and discharging would penetrate the separators in LMBs, which leads to short circuit. To inhibit the growth of lithium dendrites, we focus on optimizing the SEI layer through synergetic additives (FEC & LiNO3) in commercial carbonate electrolytes.
In the traditional carbonate electrolytes consisting of ethylene carbonate, dimethyl carbonate, lithium hexafluorophosphate, lithium bis (fluorosulfonyl)imide, the types and contents of the additives (FEC & LiNO3) are precisely regulated. We probe the electrochemical performance and morphology via Galvanostatic tests and scanning electron microscopy. Compared the control sample, Li-Li symmetrical cells, Li-Cu cells and Li-Ni83(LiNi0.83Co0.05Mn0.12O2) with the synergetic additives display better electrochemical performance with smoother surface of lithium metal.

Primary author: XU, Zhuijun (Technische Universität München)

Co-authors: PAN, Guangjiu (Technische Universität München, Fakultät für Physik, Lehrstuhl für Funktionelle Materialien); MÜLLER-BUSCHBAUM, Peter (TU München, Physik-Department, LS Funktionelle Materialien); CHENG, Ya-Jun (Ningbo Institute of Materials Technology & Engineering, CAS); Prof. XIA, Yonggao (Ningbo Institute of Materials Technology & Engineering, CAS)

Presenter: XU, Zhuijun (Technische Universität München)

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