

Abstract Submitted
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All Solid-State Lithium Metal Batteries Using Cross-linked Polymer Electrolytes QIWEI PAN, CHRISTOPHER LI, Drexel University, SOFT MATERIALS TEAM — Nowadays, to prepare all solid-state lithium metal batteries with high rate capability and stability using solid polymer electrolytes (SPEs) is still a grand challenge because of the interfaces between the SPE and the electrodes. In this presentation, we report a series of hybrid SPEs with controlled network structures by using POSS as cross-linker. These hybrid network SPEs show promising ionic conductivity, mechanical properties, and lithium dendrite growth resistance. All solid-state $\text{LiFePO}_4/\text{Li}$ batteries were also prepared using these SPEs as the electrolytes to study the effect of conductivity and mechanical properties of the SPEs on the performance of the batteries. At 90 C, the prepared cells show high rate capability and stability. Capacity up to 160 mAh/g can be obtained at a C/2 rate during the galvanostatic cycling. Capacity retention of the cells is higher than 80% after 250 cycles. Battery performance at 60 C and decay mechanism of the batteries will also be discussed.

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