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**Performance of Nanostructured Polymer Electrolytes in Li Batteries** MOHIT SINGH, LBNL, LOLA ODUSANYA, UC berkeley, NITASH BALSARA, UCB/LBNL — Batteries that employ Li anodes for high energy density applications suffer from failures due to side reactions and dendrite growth on the Li electrodes. A recent theory by Newman and Monroe (2005) shows that dendrite formation can be prevented if the shear modulus of the electrolyte can be increased by several orders of magnitude without a concomitant decrease in conductivity. The nanostructured polymer electrolyte (PE) in our study has a modulus of a glassy polymer. AC impedance measurements on Li/PE/Li systems show that the PE has high ionic conductivity. We present experimental data on the performance of a novel nanostructured dry PE in a Li/PE/Li battery. We report the DC cycling measurements, interfacial resistance measurements, and dendrite growth characteristics in Li/PE/Li cells. The performance of the nanostructured PE is compared with that of PE based on the homopolymer poly(ethylene oxide), which is a benchmark for dry polymer electrolytes.

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