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Models of novel battery architectures PAUL HANEY, DMITRY RUZMETOV, National Institute for Standards and Technology, ALEC TALIN, Sandia National Laboratories — We use a 1-dimensional model of electronic and ionic transport, coupled with experimental data, to extract the interfacial electrochemical parameters for LiCoO₂-LIPON-Si thin film batteries. TEM imaging of batteries has shown that charge/discharge cycles can lead to breakdown of the interfaces, which reduces the effective area through which further Li ion transfer can occur. This is modeled phenomenologically by changing the effective cross sectional area, in order to correlate this structural change with the change in charge/discharge I-V curves. Finally, by adopting the model to radial coordinates, the geometrical effect of nanowire architectures for batteries is investigated.

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