Abstract Submitted
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Combustion Synthesis of Energy Storage Materials[1] W. ETHAN EAGLE, MARGARET WOOLDRIDGE, University of Michigan — Advancement in the understanding of state of charge and efficiency requires better coupling of battery level properties with the micro-structure of the constituents. The composition of the target synthesis material, lithium manganese oxide ($LiMn_2O_4$, or LMO for short) is known to impact lithium ion battery properties. Following this motivation, our aim is to demonstrate control over the microstructure and compositional properties of LMO using parameters of the combustion synthesis environment. In this experiment, one or both solid phase precursors, lithium acetate-hydrate and manganse acetate-hydrate, were aerosolized and delivered to a hydrogen-oxygen Henken burner at atmospheric pressure. The characteristic time scales for reaction and flow control the synthesis process. Controlling reactant concentrations targets changes in nanoparticle composition and flow rate controls residence times and synthesis temperatures. To explore the effects of composition, first lithium oxide (Li_2O) and manganese oxide (Mn_2O_2) powders are generated independently from the corresponding acetate precursors. Following that, several mixtures of lithium and manganese acetate precursor trials were conducted and the resulting material properties were investigated using TEM and XRD.

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