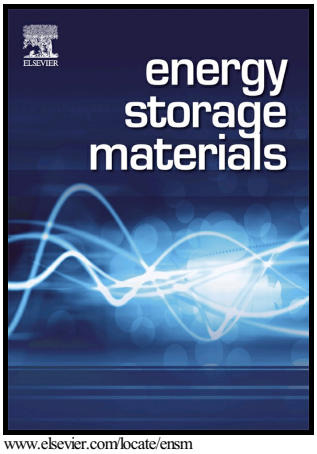

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Stabilized Li_3N for Efficient Battery Cathode Prelithiation

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Abstract

Li_3N can deliver more than 10 times the theoretical capacity of existing cathode materials and can serve as an excellent cathode prelithiation additive to offset the initial lithium loss in lithium-ion batteries. However, Li_3N has intrinsic problems of poor environmental and chemical stability in battery electrode processing environments due to its reactivity with moisture in ambient conditions and incompatibility with solvents used for battery slurry mixing. Herein, we report a facile route to prepare a surface-passivated Li_3N material by the reaction of lithium metal with nitrogen followed by an annealing process. A dense surface passivation layer consisting of crystalline Li_2O and Li_2CO_3 isolates the active composition of materials from air and thus enables good stability of Li_3N particles in ambient conditions. The as-prepared Li_3N powder is processable by slurry coating for electrode fabrication using a low-polarity solvent. The Li_3N is verified to work as a secondary lithium source to offset the initial capacity loss at the anode using a Li_3N/graphite cell configuration. A high "donor"

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