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Abstract

Na super ionic conductor (NASICON)-type $LiTi_2(PO_4)_3$ as a promising solid electrolyte has been widely used in all-solid-state lithium batteries. However, it still suffers from a low ionic conductivity. Herein, a hydrothermal-assisted solid-state reaction has been developed to synthesize rhombus-like $Li_{1.3}Al_{0.3}Ti_{1.7}(PO_4)_3$ (LATP) powder. Rhombus-like intermediate species of aluminum-doped NH_4TiOPO_4 and Li_3PO_4 are obtained by hydrothermal process, and subsequently the intermediate species are further preheated at 600 ^oC to become LATP phase without changing the rhombus-like