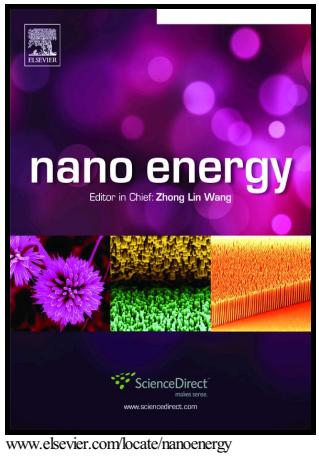

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Abstract:

Titanium niobium oxide ($TiNb_2O_7$) has been regarded as a promising anode material for high-rate lithium ion batteries (LIBs) due to its potential to operate at high rates with improved safety and high theoretical capacity of 387 mA h g^{-1}. Herein, three-dimensionally ordered macroporous (3DOM) $TiNb_2O_7$ composed of interconnected single-crystalline nanoparticles was prepared using polystyrene (PS) colloidal crystals as a hard template. The final products yields a homogeneous, continuous, and effective honeycomb-like construction. This architecture provides facile Li^+ insertion/extraction and fast electron transfer pathway, enabling high-performance lithium ion pseudocapacitive behavior, leading to good electrochemical performance. As a result, the 3DOM-$TiNb_2O_7$ shows a remarkable rate capability (120 mA h g^{-1} at 50 C) and durable long-term cyclability (82% capacity retention over 1000 cycles at 10 C). The work presented herein holds great promise for future design