OAK RIDGE NATIONAL LABORATORY
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# A long-life and high-energy lithium-ion battery using highly porous anode material for large-scale electrical energy storage

**Disclosure Number**

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**Technology Summary**

Lithium-ion batteries (LIBs) represent the most important and advanced technology among secondary batteries. After decades of effort, graphite is still the dominant anode material in commercial LIBs; however, graphite-based anode materials limit the cycle life and the charging rate capability of LIBs. The invention relates to a facile approach to prepare nanoporous anode materials with similar average storage voltage, but much higher storage capacity (281 mAh g-1) than well-known Li4Ti5O12 (~160 mAh g-1). The interconnected nanoporous framework composed of nanocrystals leads to drastically enhanced rate (a capacity retention of 70% at 20C) and cycling performance (a very small capacity decay of 0.016% per cycle over 1000 cycles) with very high coulombic efficiency (around 100%). High performance anode material with nanoporous nature was prepared by a facile approach, exhibits an average storage voltage of 1.66 V, a reversible capacity of 281 mA h g-1, and 84% capacity retention after 1000 cycles, suitable for long-life stationary lithium-ion batteries.

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