Disordered Rocksalt-type Lithium Nickel Titanium Molybdenum Oxides for Rechargeable Lithium Battery Electrodes
Technology #17881

Applications

Rechargeable lithium-ion batteries can are used in hybrid electric vehicles, load-leveling for the electric grid, portable electronic devices, electronic papers and e-book readers, sensors, and backup memory/power.

Problem Addressed

The increasing demand for high-performance lithium-ion batteries has spurred a search in diverse chemical spaces for cathode materials with high energy density. Recent scientific experiments have provided important understandings in the oxide space that enlarges the search area for high energy density cathode materials. This invention makes use of cathode materials within the oxide space to enhance the capacity and energy density of existing lithium transition metal oxide batteries.

Technology

This invention describes a disordered rocksalt Li-excess cathode material made out of Lithium, Nickel, Titanium, Molybdenum, and Oxygen. This new class of high capacity cation-disordered oxides were created based on the understanding that Li-excess compositions make cation-disordered oxides electrochemically active with facile Li diffusion. X-ray diffraction patterns, SEM images, and voltage profiles show that introducing Li excess compositions allows cathode materials to have higher capacity and higher energy density. This invention delivers high capacity and energy density that even well-layered lithium transition metal oxides rarely deliver.

Advantages

- High energy density and capacity
- Reversible

Categories For This Invention:

Energy
Energy Storage
Batteries
Lithium Batteries

Intellectual Property:
Cation disordered oxides for rechargeable lithium batteries and other applications
PCT
2017-035303
Cation disordered oxides for rechargeable lithium batteries and other applications
US Patent Pending
2019-0088940

Inventors:
Gerbrand Ceder
Jinhyuk Lee
Dong-Hwa Seo

Publications:
A Disordered Rock-salt Li-excess Cathode Material with High Capacity and Substantial Oxygen Redox Activity: Li1.25Nb0.25Mn0.5O2
Elsevier
2015
A New Class of High Capacity Cation-disordered Oxides for Rechargeable Lithium Batteries: Li-Ni-Ti-Mo oxides
Royal Society of Chemistry
2015

Image Gallery: