

次世代リチウムイオン電池用正極材料開発の最前線

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Recent research progress on positive electrode materials for advanced lithium-ion batteries
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The demand for electric vehicles equipped with Li-ion batteries is growing to develop low carbon society. Ni-enriched layered materials are used as electrode materials of Li-ion batteries for electric vehicle applications. However, available reversible capacity of Ni-enriched layered materials is approaching its theoretical limit. Therefore, innovation and development of new positive electrode materials are necessary. Recently, many cation-disordered rocksalt oxides have been proposed as a new series of electrode materials. Nevertheless, insufficient electrode kinetics for the cation-disordered rocksalt system limits its use for practical applications. One simple strategy is synthesizing nanosized materials to overcome a problem of electrode kinetics (for electrons, holes and ions), and electrode kinetics are significantly improved through nanosizing.¹⁻⁴⁾ Structural disordering also triggers unique electrode properties associated with different local environments for cations/anions.⁴⁻⁷⁾ From these results, we discuss the advantage and uniqueness of nanostructured cation-disordered rocksalt materials for high-energy advanced Li-ion batteries.

References

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