

The 113th GREEN Seminar



Composite Cathodes with Sacrificial Salt and Anion Acceptor for Li/Na-ion Batteries

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Minor-metal-free conversion-type cathodes such as FeF_3 , FeOF , and FeS_2 are promising as next-generation cathodes with low cost and large capacity. However, these cannot be used as cathodes in Li/Na-ion batteries with carbonaceous anodes, because their initial composition does not contain a Li/Na source. Composite cathodes consisting of a sacrificial salt and an anion acceptor were used to solve this problem. For example, a composite cathode using LiF as the sacrificial salt and FeF_2 as the anion acceptor was first presented by K. Kang *et al.* Since then, I have investigated Li_2O and polyanionic systems such as sulfates and carbonates in search of sacrificial salts that are more easily ionically dissociated than LiF .

I will show that these composite cathodes can be applied not only to Li-ion batteries but also to Na-ion batteries. Na-ion batteries are promising as post-Li-ion batteries, but Na has twice the ionic volume of Li and is three times heavier than Li, so they have a serious problem of insufficient energy density. However, the composite cathode with NaF and MnO reported here has a reversible capacity that exceeds the theoretical capacity of LiFePO_4 of 560Wh/kg. To our knowledge, this is the highest energy density of any cathode for Na-ion batteries reported so far. In this lecture, our trial to reconversion reaction will be also shown.

Venue: Auditorium, 1F, NanoGREEN/WPI-MANA Bldg.,
Namiki-site

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