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# A surface-reactive high-modulus binder for the reversible conversion reaction of nanoparticular cobalt oxide

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## **Abstract**

Conversion-reaction-based anode materials for lithium ion batteries (LIBs) such as transition metal oxides have been considered as high-capacity alternatives to graphite. In the conversion reactions, interestingly, microparticles have been known to be superior to nanoparticles in terms of capacity retention along repeated cycles. In this work, a cross-linked two-component binder system of poly(acrylic acid) and carboxymethyl cellulose (PAA/CMC) was used for nanoparticular  $\text{Co}_3\text{O}_4$ . The binder was characterized by high modulus and strong bonding to the surface oxide of  $\text{Co}_3\text{O}_4$ . Even without carbon coating, the composite electrodes of nanoparticular

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