Rheological behavior of concentrated anode slurries for lithium-ion battery

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Recently, an electrode manufacturing process with the battery slurries that are high in solid component is on the rise as an alternative to improve the electric capacity and durability of the electrode. Therefore, it is necessary to understand the rheological behavior of concentrated slurries for a successful electrode production. In this study, the rheological behavior of lithium-ion battery anode slurries with various active material content are explored. It is shown that aqueous anode slurries containing large amount of active material (Graphite) demonstrate two-step yielding behavior. From the comparison with slurries of various solid component concentration, the two-step yielding behavior is correlated to the glassy-network structure in concentrated slurry, which is distinguished from the thin network structure in less concentrated slurry. Additionally, role of conductive agent (Carbon Black) and binder polymer (Carboxymethyl cellulose, CMC) in determining microstructure and rheological behavior of anode slurry is discussed.