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Effective mixing of Lithium Ion/Sodium Ion Battery Slurries

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Coating slurries for making anodes and cathodes of lithium/sodium ion batteries contain a large percentage of solid particles of different chemicals, sizes and shapes in highly viscous media. A thorough mixing of these slurries poses a major challenge in the battery manufacturing process.

The cathode and anode slurries are usually made up of four major components. These are an active material, a conductive agent, a binder and a solvent. The active and conductive materials are solids in powder form, whose size varies from nano- to micro-scales. These solid powders are bound together with a binder in either an aqueous or an organic solvent. A homogeneous mixing of the active material composite is very important for uniform coating of the electrode material and better battery performance.

Several types of mixing methods were examined. One of the major issues during this slurry making is the uniform mixing of the above-mentioned components. For this, the Thinky Mixer- THINKY ARM-310 (Figure 1) is used for this application to ensure homogeneous mixing of the electrode material, conducting additive and binder. Figure 2 shows the slurry making procedure, where the electrode materials were dissolved in the solvent by mixing for 5 min at 2000 rpm using the Thinky Mixer. Through centrifugation and simultaneous self-rotation of the mixing bowl, this model offers maximum possible mixing and thus homogeneous electrode material composite.



Figure 1: Thinky Mixer ARM-310

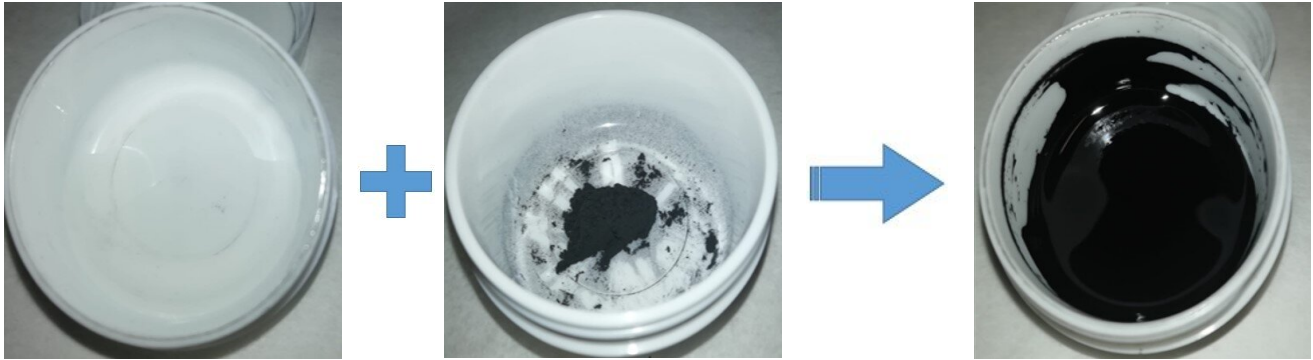


Figure 2: Battery electrode Slurry preparation using Thinky Mixer

The Adelhelm group at Humboldt University Berlin (Institute of Chemistry) is studying fundamental aspects of materials for lithium-ion and sodium-ion batteries. This involves the slurry-based preparation of electrodes from new inorganic materials. Typically, these materials are only available in small amounts (mg to few grams per batch) which can be easily processed using a Thinky Mixer.



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