

Electrodepositing lithiophilic nanoparticles as artificial interphase for anode-free lithium ion batteries

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Anode free batteries are designed to significantly decrease the weight of a cell. They necessitate immaculate reversibility of the charge and discharge process, as no further lithium other than the amount loaded into the cathode is available. Homogeneous plating and stripping of lithium onto a current collector is not readily achieved when plating on e.g. on copper. Lithiophilic metals like Au and Zn can be used to engineer the surface of a current collector, for example through the application of a thin sputtered film (50 nm), with which the lithium forms metallic interphases and hence drastically changes the plating environment. This can be explored further through the electrodeposition of said metals, which can be generated with different size and number density and therefore provide a variety of plating substrate configuration. Correlating morphology and arrangement of the particles to their electrochemical behaviour in lithium half cells should elucidate their effect on the anode interphase and allow for precise decoration of the current collector for improved batteries.

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