Bio-Based Battery Materials for Circular Energy Storage Systems

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Abstract:

The demand for electrochemical energy storage is increasing rapidly due to a combination of decreasing costs in renewable electricity, governmental policies promoting electrification, and a desire by the public to decrease CO_2 emissions. Lithium-ion batteries are the leading form of electrochemical energy storage for electric vehicles and the electrical grid. Lithium-ion cell anodes are mostly made of graphite, which is derived from geographically constrained, non-renewable resources using energy-intensive and highly polluting processes. Thus, there is a desire to innovate technologies that utilize abundant, affordable, and renewable carbonaceous materials for the sustainable production of graphite anodes under relatively mild process conditions. This presentation highlights novel attempts to realize the aforementioned benefits through innovative technologies that convert biocarbon resources, including lignocellulose, into high quality graphite for use in lithium-ion anodes.