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Renewable Energy Storage

September 9, 2015

3:25 p.m.

202 Gavett Hall

Energy storage is critical to intermittent renewable power sources, such as solar, to supply continuous electricity. Electrochemical (battery) and thermal storage are two promising candidates for grid-scale energy storage. Recent progress towards improving the performance and the cost competitiveness of these two technologies will be discussed. Research in the first area focuses on developing composite nanomaterials for use as lithium-ion battery (LIB) electrodes. Lithium alloys are incorporated within high-surface-area carbon nanofibers *via* electrospinning. When evaluated as LIB anodes, the nanocomposites improve the storage capacity over conventional materials (i.e., graphite). The second technology area highlights a thermal storage media composed of dry ceramic particles. The particle-based media flows freely after overnight storage at temperatures exceeding 1,100°C, more than 500°C above the operational limit of conventional heat transfer fluids. The challenges for both technologies when coupled with renewable power sources will also be discussed, including a techno-economic comparison with fossil fuel-based power.