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Title: New Materials for Solar Thermal Capture and Storage

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Solar thermal fuels, which reversibly store solar energy in the chemical bonds of molecules, possess numerous advantages over existing energy technologies. These fuels are ideally 100% renewable, produce no emissions, are easily transportable and rechargeable, and provide energy (heat) on-demand. Large-scale adoption could have an unprecedented impact on energy use. However, previous fuels have faced the challenges of rapid degradation, low volumetric energy density, and the reliance on non-abundant, expensive elements. I will discuss our recent work on the development of a novel class of solar thermal fuels that combine inexpensive photoswitchable molecules with nanoscale templates to simultaneously and effectively tune both energy density and thermal stability. These fuels are predicted to have large cycling capability, and both gravimetric and volumetric energy densities comparable to Li-ion batteries.