Preparation of new energy storage materials

Are phase change materials suitable for thermal energy storage?
Phase change materials (PCMs) having a large latent heat during solid-liquid phase transition are promisingfor thermal energy storage applications. However,the relatively low thermal conductivity of the majority of promising PCMs (<10 W/(m ? K)) limits the power density and overall storage efficiency.

What are the design principles for improved thermal storage?
Although device designs are application dependent, general design principles for improved thermal storage do exist. First, the charging or discharging rate for thermal energy storage or release should be maximized to enhance efficiency and avoid superheat.

What are the research areas in energy storage based on molten salts?
His research in energy storage area includes liquid and compressed air energy storage and thermal energy storagebased on molten salts,phase change materials,and thermochemical materials. He has published over 550 technical papers with ~400 in peer-reviewed journals (GS H Index of ~80) and filed ~100 patents.

How does a TES technology store energy?
A TES technology stores energy by heating or cooling a storage materialwhen energy production exceeds demand and makes it available later by discharging the energy from the storage material (see Fig. 1).

What are latent heat storage materials (PCMs)?
Latent heat storage materials,more often termed as phase change materials(PCMs),store heat through phase transition,e.g.,liquid-solid,of the materials. PCMs are favored for the benefits of high energy density and nearly isothermal process during energy charging and discharging.

Can electrochemical energy storage be used in supercapacitors & alkali metal-ion batteries?
This Review concerns the design and preparation of such materials,as well as their application in supercapacitors,alkali metal-ion batteries,and metal-air batteries. Electrochemical energy storageis a promising route to relieve the increasing energy and environment crises,owing to its high efficiency and environmentally friendly nature.

Thermochemical energy storage (TCES) stores heat by reversible sorption and/or chemical reactions. TCES has a very high energy density with a volumetric energy density ~2 times that of latent heat storage materials, and 8-10 times ...

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