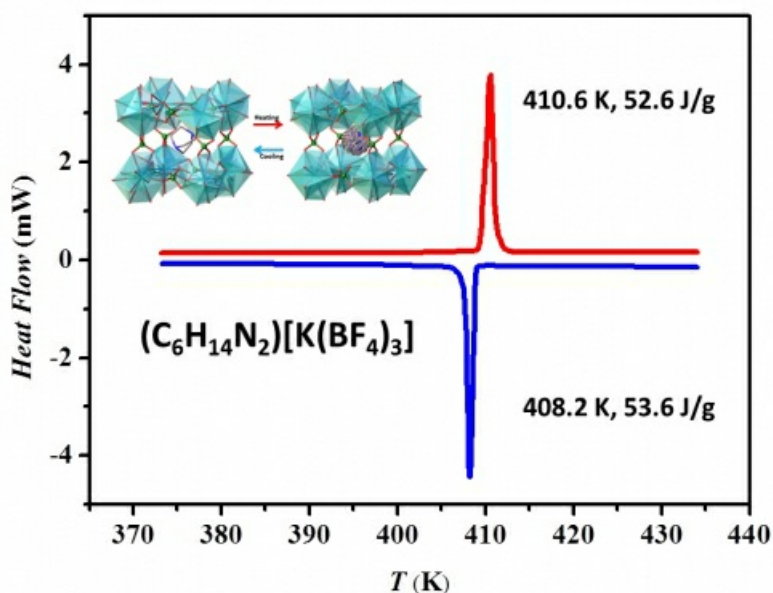


*Thermal energy storage in a 3D perovskite-type compound*Shaoli Chen¹, Weixiong Zhang¹, Xiaoming Chen¹¹School Of Chemistry, Sun Yat-Sen University, Guangzhou, China

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Thermal energy materials as efficient ways of energy storage and recovery have been used widely to deal with the concerns about energy crisis of development of human society. Solid-solid phase change materials (ssPCMs), which release and absorb isothermal energy at a nearly constant temperature during their phase transitions, have been extensively investigated for the past few years as applied in direct thermal energy storage, solar energy applications and so on. Recently, some layered perovskite-type hybrid inorganic-organic crystalline complexes have caught people's attention again for their abilities in overcoming difficulties in supercooling and phase separation which is common in conventional inorganic hydrated compounds. Here we present a new 3D perovskite-type hybrid compound, $(C_6H_{14}N_2)[K(BF_4)_3]$. By single-crystal X-ray structural analyses, we learn that $(C_6H_{14}N_2)[K(BF_4)_3]$ crystallized in Pa-3 space group. TGA and DSC measurements reveals that $(C_6H_{14}N_2)[K(BF_4)_3]$ has a reversible solid-solid phase change (410.6 K) with considerable latent heat (~ 52 kJ/g) and small supercooling (< 2 K) before decomposition temperature (> 473.2 K). As the host-guest interactions related with order-disordered organic guest cations plays the key role in the critical phase change temperature and the ability to store heat, we speculate that stepless regulation of phase transition temperature becomes possible by fully or partially substituting congener metal ions/organic guest cations/bridge ions inside the isomorphic perovskite-type compounds. It is foreseeable that 3D perovskite-type compounds may be another choice for design of solid-solid phase change materials.

**Keywords:** [perovskite-type](#), [latent heat storage](#), [phase change materials](#)