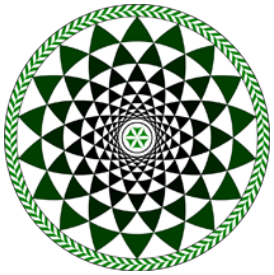

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Tuning of magnetic field-induced properties of Mn₉W₆-based networks

Tuesday, July 7, 2015 8:30 PM (1h 30m)

Pentadecanuclear {M^{II}₉[M'^V(CN)₈]₆L_x(solv)_y (M - paramagnetic 3d cation, M' – paramagnetic Mo, W centers, L – chelating and bridging ligands) high-spin clusters are of scientific interest because of magnetic properties, notably slow magnetic relaxation and single molecule magnet behavior, magnetocaloric effect, and structural/spin phase transitions. A variety of discrete and extended coordination frameworks could be attained by incorporation of organic ligands, as was demonstrated in previous research. These properties enable us to use the clusters as the secondary building blocks (SBBs) in multifunctional materials exploiting the external control of structural and magnetic state [1-4].
Using the blocking 4,4'-di-tert-butyl-2,2'-bipyridine (ditbubpy) and the bridging aldrithiol-4 (ald-4), we obtained two new compounds: {Mn₉[W(CN)₈]₆(ditbubpy)₈(MeOH)<sub> (1) and {Mn₉[W(CN)₈]₆(ald-4)₄(MeOH)₂₄} (2). We successfully tuned the intercluster distances and overall spatial distribution of Mn₉W₆ secondary building block. 1 is composed of fairy distinguished 1-D supramolecular chains, while 2 contains 1-D coordination chains due to bridging and decorating function of ald-4, with more isotropic clusters distribution. This provided the opportunity to study magnetic field induced properties: slow magnetic relaxation and magnetocaloric effect.

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