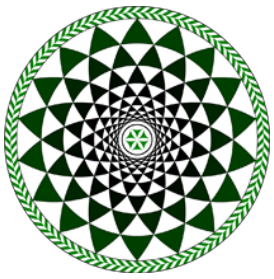

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Magnetocaloric effect of three cyanido-bridged coordination polymers based on Mn(II) and Nb(IV)

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

Magnetocaloric effect for {[Mn(II)(pyrazole)₄]₂[Nb(IV)(CN)₈]·4H₂O}_n (1), {Mn(II)₂(imH)₂(H₂O)₄[Nb(IV)(CN)₈]·4H₂O}_n (2) and [Nb(IV){(μ-CN)₄Mn(II)(H₂O)₂}₂·4 (3) is reported. The compounds belong to a class of 3D coordination polymers. They exhibit a phase transition to a long range magnetically ordered state at 22.8 K (1), 24.1 K (2), and 47 K (3). Heat capacity measurements by relaxation calorimetry in applied field of 0.1, 0.2, 0.5, 1, 2, 3, 4, 5, 7, and 9 T enabled to determine the magnetic entropy change ΔS_M as well as the adiabatic temperature change ΔT_{ad}. The maximum values of ΔS_M calculated for a field change of 5 T amount to 6.65 J kg⁻¹ K⁻¹ (1), 9.5 J kg⁻¹ K⁻¹ (2), and 9.01 J kg⁻¹ K⁻¹ (3). The corresponding maximum values of ΔT_{ad} are 1.4 K at 23.8 K (1), 2.02 K at 25.1 K (2), and 1.7 K at 49.0 K (3). The temperature dependence of the exponent n characterizing field dependence of ΔS_M has been estimated. Exponent n attains the value of 0.64 (1), 0.67 (2), and 0.69 (3) at the transition temperature, which is close to that expected for the three-dimensional Heisenberg universality class. Universal scaling of the magnetic entropy change is discussed.

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