Contribution ID: **370** Type: **Poster Presentation**

Magnetic properties and magnetocaloric effect in NdPd2Al2

Thursday, 28 June 2018 15:00 (2 hours)

The magnetic properties and magnetocaloric effect (MCE) of the tenary intermetallic NdPd2Al2 compound have been investigated by means of X-ray diffraction (XRD), magnetic susceptibility χ(T), magnetization M(μ0H), isothermal magnetization M(μ0H,T) and MCE measurements. XRD studies indicate a tetragonal crystal structure with space group P4/nmm (No.: 129). The low temperature χ(T) data exhibits a maximum characteristic of antiferromagnetic (AFM) phase transition at TN = 3.2 K. At high temperature, the χ(T) data follows the Curie – Weiss relation with effective magnetic moment μeff = 3.654(5) μB and a Weiss temperature θp = -3.3(4) K. The value of μeff obtained is close to the value of 3.62 μB expected for the free Nd3+ - ion. The magnetization data indicate metamagnetic transition at low magnetic field and a tendency toward saturation at high field. Arrot – plots indicate a second – order phase transition. The MCE effect was estimated from the isothermal magnetization to be 18 J/(kg.K) for a field change of 7 T. The characteristic behaviour of the isothermal magnetic entropy change points to a second – order character of the AFM phase transition as observed from the Arrot - plots.

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Session Classification: Poster Session 2

Track Classification: Track A - Physics of Condensed Matter and Materials