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Nature of magnetic ordering in $Ni(OH)_2$ nanoplates JAMES RALL, MOHINDAR SEEHRA, West Virginia University — Nickel hydroxides are important for their potential applications in rechargeable batteries and as precursors for NiO and Ni catalysts. β–$Ni(OH)_2$ has the CdI_2 layered structure with Ni atoms forming a hexagonal unit cell. Here, we report on the magnetic ordering in 17 nm $\times$ 4 nm nanosheets of β–$Ni(OH)_2$. Measurements of the magnetization M as a function of temperature (2K to 300K) and magnetic field H up to $\pm$65kOe are reported. M vs. T data in H =100 Oe for the ZFC case shows a peak in M at T_N = 24 K characteristic of antiferromagnetic (AF) ordering; however for T > T_N, the Curie-Weiss (χ = C/(T - θ)) fit yields θ = 26K characteristic of ferromagnetism. Following Takada (J. Phys. Soc. Jpn. 21, 2745, 1966), we measured M vs. H loops from T = 2K to 25K and observed a metamagnetic transition at H_c = 56 kOe at 2K, with H_c decreasing with increasing T. These results suggests strong ferromagnetic coupling among Ni within (001) sheets and a weaker antiferromagnetic coupling in the neighboring (001) sheets, and [001] as the easy axis. This model is used to determine the exchange constants consistent with the observed Curie-Weiss variation.

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