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Temperature Dependence of the Coercivity of VO_2/Ni Bilayers
JOSHUA LAUZIER, LOGAN SUTTON, JOSE DE LA VENTA, Colorado State Univ — The temperature dependence of the coercivity and magnetization of VO_2/Ni bilayers was studied. VO_2 exhibits a well-known Structural Phase Transition (SPT) at 330-340 K, from a low temperature monoclinic (M) to a high temperature rutile (R) structure. VO_2/Ni bilayers were grown using a magnetron sputtering technique onto different substrates. The magnetic properties were measured using a Vibrating Sample Magnetometer. The SPT of VO_2 induces an inverse magnetoelastic effect that strongly modifies the coercivity and magnetization of the Ni films. In addition, the growth conditions allow tuning of the magnetic properties. Ni films deposited in the rutile phase on top of VO_2 (M) show an irreversible change in the coercivity after the first cycle through the high temperature phase, with a corresponding change in the surface morphology. On the other hand, the Ni films grown on top of VO_2 (R) do not show this irreversibility. These results indicate that: i) magnetic properties of magnetic films are strongly affected by the strain induced by materials that undergo a structural phase transition; and ii) it is possible to control the properties by tuning the growth conditions.

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