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Coercivity Enhancement in V_2O_3/Ni Bilayers[1] SIMING WANG, Department of Physics and Center for Advanced Nanoscience, Materials Science and Engineering Program, University of California San Diego, JOSE DE LA VENTA, Department of Physics, Colorado State University, THOMAS SAERBECK, JUAN GABRIEL RAMIREZ, Department of Physics and Center for Advanced Nanoscience, University of California San Diego, IVAN K. SCHULLER, Department of Physics and Center for Advanced Nanoscience, Materials Science and Engineering Program, University of California San Diego — We studied the temperature dependence of the coercivity and magnetization of V_2O_3/Ni bilayers. When the V_2O_3 is in the middle of the metal to insulator transition, we observe a maximum enhancement of the coercivity and a decrease of the magnetization. The maximum value of the coercivity shows a 300% increment compared to the room temperature value. The decrease of the magnetization indicates magnetic domain formation. We propose a model in which the inhomogeneous V_2O_3 phase transition induces nanoscale stress and disorder in the Ni film. The local stress anisotropy and disorder break the Ni film into magnetic domains and pin the domain walls in Ni. The model is supported by micromagnetic simulations and shows that magnetic properties of ferromagnetic films are strongly affected by the proximity to materials that undergo inhomogeneous phase transition at nanoscale.

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