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Anomalous Magnetoresistance Effects in $(CrO_2)_{1-x}$: $(MgB_2)_x$ powders RAGHAVA PANGULURI, B. NADGORNY, Department of Physics, Wayne State University, Detroit, MI 48201 — It is known that the electrical conduction mechanism in compressed powders and polycrystalline CrO_2 films is due to the intergranular tunneling. Here, we focus on the percolation effects in the CrO_2 powders intermixed with a superconductor, MgB_2. A mixture of $(CrO_2)_{1-x}$: $(MgB_2)_x$ powders with $0 \leq x \leq 1$ were cold-pressed to form circular disks. The electrical resistance measured by a four probe technique, as expected showed a lower resistance for the mixture when compared to the pure pressed CrO_2. The observed hysteresis extrinsic magnetoresistance (MR) showed peaks corresponding to the coercive fields of CrO_2 which can be associated with the alignment of magnetization of adjacent CrO_2 particles. Interestingly, the MR changed signs at around the superconducting transition temperature of MgB_2 ($\sim$40K) and also the slope of MR at high magnetic fields changed from positive to negative. We will discuss a possible origin of the observed effects, which we believe are related to the ferromagnet/superconductor interaction.

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