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The coupling of magnetic and dielectric properties in magnetic nanoparticles R. TACKETT, Wayne State University, O. MASALA, UCSB, B. ADHIKARY, R. NAIK, Wayne State University, A.P. RAMIREZ, Bell Labs, R. SESHADRI, UCSB, G. LAWES, Wayne State University — The low frequency dielectric properties of γ-Fe_2O_3 and $MnFe_2O_4$ magnetic nanoparticles have been investigated. These samples showed frequency dependent dielectric anomalies near their respective magnetic blocking temperatures suggesting a coupling between the magnetic and dielectric properties of the systems. In addition, the samples exhibited considerable magnetocapacitance above the magnetic blocking temperature. The magnetic field induced change in the dielectric constant was shown to be proportional to the square of the magnetization, suggesting that the dielectric properties of these systems are strongly connected to the distribution of magnetic moments in the samples. The results will be discussed in the framework of a theory explaining how magnetodielectric effects can arise from magnetoresistance in a Maxwell-Wagner capacitance model.

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