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Electrical and Magnetic Properties of Nanostructured Mo-Doped Yttrium Iron Garnet[1] S. KHANRA, A. LAUDARI, Department of Physics, Missouri State University, Springfield, MO 65897, Y. KOLEKAR, Department of Physics, Pune University, India, P. KAHOL, K. GHOSH, Department of Physics, Missouri State University, Springfield, MO 65897 — Yttrium Iron Garnet (YIG) is a synthetic garnet and ferromagnetic with the chemical formula $Y_3Fe_5O_{12}$. In YIG, five iron (III) ions occupy two octahedral and three tetrahedral sites, with yttrium (III) ions coordinated by eight oxygen ions in an irregular cube. The iron ions in the two coordination sites exhibit different spins, resulting in magnetic behavior. It is also transparent to infrared wavelengths over 600 nm. Nanostructured YIG has been synthesized systematically by solid state reaction method. The formation of pure YIG have been investigated through X-ray diffraction (XRD) beginning from weighing in molar proportions of Y_2O_3 and Fe_2O_3, mixing and grinding, presintering and final sintering at 1300 °C. XRD study shows that YIG exhibits cubic structure with lattice constant of about 12 Å. Magnetization with varying field and temperature has been measured using a SQUID magnetometer. Room temperature dielectric measurements indicate that the YIG shows the usual dielectric dispersion. Magnetic studies of Mo YIG has shown that it becomes diluted after doping and dielectric measurement have shown that dielectric constant of that sample has been reduced.

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