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Physical and microwave characteristics of Gd-doping yttrium iron garnet (YIG)[1] M.F. TAI, Dept. of Physics, National Tsing Hua University, K.Z. WANG, Wu-Feng Institute of Technology, L.R. HONG, C.J. WU, L.C. LIN, H.C. KU, Dept. of Physics, National Tsing Hua University, S.Z. LIU, K.M. KWO, Chung-Sham Institute of Science and Technology — Ferrimagnetic insulating yttrium iron garnet (YIG) are widely used in microwave devices due to their unique magnetic, electrical and microwave properties. The substitution of rare earth ion for the Y^{3+} ion can modulate or improve its high-frequency properties for microwave application. We prepared a serial of single-phased polycrystalline $Y_{3-x}Gd_xFe_5O_{12}$ garnet samples with x= – 3.0 by the conventional ceramic technique. The refinement of X-ray diffraction patterns of the samples shows them to crystallize in a centrosymmetrically cubic structure with a *Ia3d* space group. Both the lattice constant and dc saturation magnetization at room temperature decrease with increasing Gd^{3+} We also measured the low- and high-frequency dielectric constant and tangent loss. As well, the spin wave line width ΔH_k regarding the ferromagnetic resonance behavior is on progress. These results are important to develop high-power circulators and isolators in microwave range.

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