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Abstract

This chapter discusses the synthesis and characterization of iron garnets by doping with Ce^{3+} , Cr^{3+} , and In^{3+} selectively at the three lattice sites. The importance of the preparative method (modified sol-gel method) in obtaining a phase pure compound without any cation segregation or impurity phase is discussed. Different instrumental techniques are used to confirm the monophasic formation of the compounds and the valence states of the various ions. Selective occupation of the tetrahedral and octahedral sites by the dopant ions has been proved with the help of Mössbauer spectroscopy. In the end, magnetic applications of iron garnets are discussed by taking suitable examples.