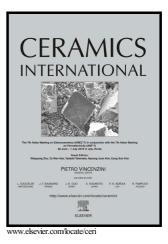
## Author's Accepted Manuscript

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 PII:
 S0272-8842(18)30746-6

 DOI:
 https://doi.org/10.1016/j.ceramint.2018.03.179

 Reference:
 CERI17816

To appear in: Ceramics International

Received date:12 March 2018Revised date:19 March 2018Accepted date:20 March 2018

Cite this article as: R. Peña-Garcia, Y. Guerra, D. Martínez Buitrago, L.R.F. Leal, F.E.P. Santos and E. Padrón-Hernández, Synthesis and characterization of yttrium iron garnet nanoparticles doped with cobalt, *Ceramics International*, https://doi.org/10.1016/j.ceramint.2018.03.179

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#### **ACCEPTED MANUSCRIPT**

### Synthesis and characterization of yttrium iron garnet nanoparticles doped

with cobalt

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#### Abstract

In this work, we have synthesized and characterized yttrium iron garnet nanoparticles doped with cobalt. The X-ray diffraction data showed a single phase, belonging to the cubic structure of  $Y_3Fe_5O_{12}$ . Rietveld refinement revealed variation of the angles and interionic distances ( $Fe^{3+}(a)-O^2 \cdot Y^{3+}(c)$  and  $Fe^{3+}(d)-O^2 \cdot Y^{3+}(c)$  when  $Fe^{3+}$  ions are replaced by  $Co^{3+}$  ions in the tetrahedral (*d*) and octahedral (*a*) sites of YIG. In addition, the lattice parameter *a*, decreases from 12.3846 Å to 12.3830 Å with the increasing of cobalt concentration. The analysis by Infrared and Raman spectroscopies has shown a slight stretching at lower wave numbers as the dopant concentration increased. The magnetic measurements confirm the substitution of  $Fe^{3+}$  by  $Co^{3+}$  in the *a*-sites and *d*-sites with the reduction of the saturation magnetization from 26.63 emu/g to 24.92 emu/g, for  $0.000 \le y \le 0.030$ . Changes in the coercive field varying the dopant concentration were related to the particle size and pinning centers existence.

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