Accepted Manuscript

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PII: S1350-4487(17)30330-X

DOI: 10.1016/j.radmeas.2017.05.001

Reference: RM 5784

To appear in: Radiation Measurements

Received Date: 2 August 2016
Revised Date: 25 April 2017
Accepted Date: 12 May 2017

Please cite this article as: Jacobsohn, L.G., McPherson, C.L., Oliveira, L.C., Kucera, C.J., Ballato, J., Yukihara, E.G., Radioluminescence and thermoluminescence of rare earth doped and co-doped YF₃, *Radiation Measurements* (2017), doi: 10.1016/j.radmeas.2017.05.001.

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ACCEPTED MANUSCRIPT

Radioluminescence and Thermoluminescence of Rare Earth Doped and Co-Doped YF₃

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Abstract: An investigation of the luminescent properties of undoped and rare earth (RE) singly- and co-

doped YF3 was carried out by means of radioluminescence (RL) and thermoluminescence (TL)

measurements. Materials were obtained by ligand-free co-precipitation with Ce, Tm, Tb or Eu

substituting for Y, followed by calcination in air at 500 °C for 1 h. RL measurements confirmed the

effective luminescence activation of the host. TL measurements revealed a relatively intense

contribution of the host, with Tm doping yielding the strongest signal among the singly-doped samples.

Co-doping with Ce and Tm was investigated within the 0.5-5 mol% range for each RE, with the 0.5,0.5

(Ce,Tm) mol% co-doping yielding the strongest luminescence signal. However, a clear correlation

between the RE dopant(s) and TL peaks was not found.

Keywords: YF₃; rare earth; radioluminescence; thermoluminescence; thermosensor

1

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