

## عنوان مقاله:

Investigating the dosimetric application of nanopowders of Yttrium Iron Garnet with the substitution of bismuth and manganese cations

## محل انتشار:

سومین کنفرانس بین المللی فناوری های نوین در علوم (سال: 1402)

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## خلاصه مقاله:

The  $\text{Bi}^{3+}$  and  $\text{Mn}^{2+}$  cations were doped in Yttrium Iron Garnet (YIG)  $\text{Y}_3\text{-xBi}_x\text{Fe}_5\text{-xMn}_x\text{O}_{12}$  ( $x=0, 0.1, 0.2, 0.3$ , and  $0.5$ ) nanoparticles by a mechanochemical method. The experimental optimum time for ball milling was 15 hours. To investigate the structure, size and shape of particles, the following techniques were used: X-ray diffraction (XRD) and transmission electron microscopy (TEM). The results of the investigation of the crystal structure show that YIG nanoparticles with an average particle size of 40 nm are formed in a single phase and with a cubic structure, and the best calcination temperature is about  $1100^\circ\text{C}$  for 3 hours. This temperature is lower than the desired phase formation temperature in the conventional ceramic method. The maximum thermoluminescence response to the gamma rays of the  $^{60}\text{Co}$  source was obtained in 0.3 mol% of the impurity. A computer program based on general-order kinetics was used to determine the number of peaks in the thermoluminescence radiation curve and the kinetic parameters related to each peak. Two overlapping peaks were observed at temperatures of 398 and 422 K in the thermoluminescence curve of this nanoparticle. The results show that this nanoparticle has suitable conditions for use in dosimetry

## کلمات کلیدی:

mechanochemi , TL, Kinetic parameters, Yttrium Iron Garnet, Dosimetry

## لینک ثابت مقاله در پایگاه سیویلیکا:

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