

# Synthesize and investigation of magnetic properties of Ca-Zr doped Bi-YIG nano powders via mechano chemical processing method

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Calcium- zirconium-substituted Bismuth-yttrium iron garnet nanoparticles with composition of  $(\text{BiY}_{2-x}\text{Ca}_x\text{Fe}_{5-x}\text{Zr}_x\text{O}_{12})$  were prepared by mechano chemical processing and subsequent heating treatment. X varied from 0 to 1.25 by step 0.25. The effect of Zr mol ratio on Phase formation

and crystalline structure were investigated by X-ray diffraction (XRD), IR spectroscopy and scanning electron microscopy (SEM). The magnetization and susceptibility of samples was studied by AGFM and . The experimental results show

that the Zr substitution lowers the phase formation and sintering temperature. This results show that single-phase powders can be obtained at temperature lower than 850°C

which is much lower than an undoped sample  $\text{Y}_3\text{Fe}_5\text{O}_{12}$  (900°C) [1].

Key words: Ca, Zr, Bi substituted Yttrium iron garnet, Nanoparticles, mechano chemical processing