

## **Preparation of samarium iron garnet nanoparticles via modified conventional mixing oxides method**

### **ABSTRACT**

This work is concerned with the preparation of samarium iron garnet ( $\text{Sm}_3\text{Fe}_5\text{O}_{12}$ ) nanoparticles via an improved technique named: Modified Conventional Mixing Oxides (MCMO) method. This material was characterized by XRD, FESEM, EDX and TEM. Metal oxides and ethanol solution were used as raw materials to prepare  $\text{Sm}_3\text{Fe}_5\text{O}_{12}$  (SmIG) material. Single-phase SmIG nanoparticles with an average particle value of 25 nm and average crystallite size value of 44 nm have been synthesized at 1350 °C via the MCMO method. SmIG powders with grain sizes below 1  $\mu\text{m}$  and high purity have been presented by FESEM and EDX results, respectively. Lattice constant value of 12.535 Å and density value of 6.221  $\text{g}\cdot\text{cm}^{-3}$ , were calculated for the SmIG sample. The latter has reached around 99% of its theoretical density. The MCMO method appears to be an attractive route due to the enhancement of structural properties of the interested sample with high yield in the nano-scale product as compared to other preparation techniques.

**Keyword:** EDX; FESEM; MCMO method; SmIG; TEM; XRD