
Contribution ID: **215** Type: **Poster Presentation**

# Structural and Optical properties of rare-earth doped Magnesium ferrites

Nanoparticles of magnesium ferrite ($MgFe_2O_4$) and rare earth (RE)(La, Sm)-doped magnesium ferrite ($Mg(RE)_{0.2}Fe_{1.8}O_4$) were synthesized via the hydrothermal method and annealed at 500℃, 700℃, and 900℃. X-ray diffractometry (XRD), Ultraviolet-Visible Spectroscopy (UV-Vis), High-Resolution Transmission Electron Microscopy (HRTEM), and Photoluminescence (PL) spectroscopy were utilised for structural and optical characterization. XRD confirmed the formation of a cubic spinel structure, with Bragg peak intensity increasing at 900℃ across all samples. Crystallite size decreased with increasing molecular weight, indicating enhanced structural refinement. HRTEM further confirmed improved crystallinity at 900℃. UV-Vis analysis revealed a notable reduction in bandgap upon La and Sm doping, suggesting enhanced electronic properties. PL spectra indicated dual-wavelength photon emission (495 nm and 503 nm) for pure $MgFe_2O_4$, while doping significantly suppressed PL intensity, leading to single-wavelength emission at 500 nm (2.48 eV).

## Apply for student award at which level:

MSc

## Consent on use of personal information: Abstract Submission

Yes, I ACCEPT

**Primary author:** Ms NGUBELANGA, Ncembu Onke (University of Zululand)

**Co-authors:** Dr NDLANGAMANDLA, Ceboliyazakha L. (University of Zululand); Dr MKWAE, Prince S. (University of Zululand); Mr OGUNDIPE, Sunday A. (University of Zululand)

**Presenter:** Ms NGUBELANGA, Ncembu Onke (University of Zululand)

**Session Classification:** Poster Session

**Track Classification:** Track A - Physics of Condensed Matter and Materials