**Abstract:**

Lithium ferrite Li0.5Fe2.5O4 has been synthesized by the use of the sol–gel technique. X-ray diffractometer (XRD) has been employed to confirm the crystal structure of spinel ferrites. No impurity peaks are detected in XRD graph, which confirms single phase crystal structure. The evaluation of grain size and analysis of external [surface morphology](https://www.sciencedirect.com/topics/materials-science/surface-morphology) of synthesized lithium ferrites has been done by scanning electron microscope (SEM). Average grain size was about equal to 131 nm. Energy dispersive x-ray spectra showed all the elements were present in required proportions. Magnetic characteristics such as saturation magnetization (Ms), remanence (Mr), and coercive force (Hc) have been measured from MH loops. Saturation magnetization has been measured to be 43.69 emu/by law of approach to saturation. The coercivity value lies in the range of few hundred Oersted which is vital condition for electromagnetic materials. [Cyclic Voltammetry](https://www.sciencedirect.com/topics/materials-science/cyclic-voltammetry) (CV) measurements were made, to know about the electrochemical performance of the material. CV results show that with the increase in scan rate specific capacitance decreases and the area of the loop increases which is promising for the formation of super capacitors and lithium-ion batteries (LIB's).