Correlation of magnetic dynamics and charge transport in M-type hexaferrites

Abstract

Hexaferrites are a class of magnetic materials with complex structural and electronic properties, hosting a range of exotic phenomena while also finding extensive applications in engineering. There are six primary types of hexaferrites: M, Y, W, Z, X, and U ordered by increasing structural complexity.

This seminar presents a summary of a study that investigated collective magnetic and dielectric dynamics of M-type hexaferrites, with a particular focus on relaxation phenomena and correlation effects. Using a combination of experimental techniques, including a.c. susceptibility, dielectric spectroscopy, d.c. transport measurements, and X-ray spectroscopies, the study found a correlation between magnetic domain dynamics and charge transport. This correlation persists despite the absence of a direct magnetoelectric coupling.

To explain these findings, the hypothesis of charged magnetic domain walls is proposed. This proposed emergent phenomenon of charged magnetic domain walls could provide a new platform for exploring magnetoelectric coupling in complex oxide materials.

Keywords: **Hexaferrites**, **Magnetic Relaxation**, **Dielectric Spectroscopy**, **Domain Dynamics**, **Magnetoelectric Coupling**

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