



**Report: Workshop on Synthesis of Nanoferrites at Shoolini University,
Solan
Or
Industrial Visit**

Department of Physics, Centre of excellence, Govt. College Sanjauli organized a workshop cum Industrial visit for two days on 23rd and 24th September 2024, under DBT Star College Scheme at Shoolini University, to gain firsthand experience in the synthesis of nanoferrites. A group of 15 students from the Department of Physics and Chemistry along with faculty members Dr. Kirti Singha and Dr. Yogesh embarked on this academic visit. The visit or workshop was organized as part of a material science and nanotechnology course, with the goal of providing students with a deeper understanding of the synthesis techniques, properties, and applications of Nanoferrites. Shoolini University, known for its cutting-edge research in nanotechnology, offered an ideal platform for the students to explore this subject in a practical and immersive manner.

Upon arriving at Shoolini University, the students were warmly welcomed by the faculty of the Department of Nanotechnology. The day began with a brief introduction to the university's research facilities, its focus on nanomaterials, and the importance of nanoferrites in modern technology. The students were excited to explore the synthesis process and eagerly looked forward to the day's sessions.



Day 1: After a brief demonstration by Associate Professor Dr. Rohit Jasrotia of Shoolini University, the students proceeded to synthesize the soft ferrite series framed by Dr. Kirti Singha from the Department of Physics, Centre of Excellence, under the supervision of Himanshi, a research scholar at Shoolini University, guided the synthesis process using the Sol-Gel method to produce spinel ferrites. The day's activities wrapped up by 6 PM.





Day:2 The nanoferrites were successfully synthesized up to the halfway stage. Research scholar Himanshi provided a demonstration on the calcination process for the synthesized nanomaterial. The students enthusiastically prepared the mother sample, expressing satisfaction with their progress.





Overview of Nanoferrites:

The first session focused on providing students with theoretical knowledge about nanoferrites. Nanoferrites are a class of magnetic materials composed of metal oxides, commonly iron oxides, combined with other metals like cobalt, nickel, or zinc. Due to their small size and enhanced magnetic, optical, and electrical properties, they have found applications in diverse fields such as electronics, magnetic storage devices, biomedical treatments, and environmental remediation.

Introduction to Synthesis Methods:

The faculty introduced various synthesis methods used for the formation of nanoferrites. While there are several methods, such as the co-precipitation method, hydrothermal synthesis, and combustion techniques, the primary focus of the visit was on the sol-gel method, a widely used technique for synthesizing nanoferrites due to its simplicity and ability to produce high-quality nanoparticles.

Interactive Session with Experts:

Following the hands-on demonstration, the students had the opportunity to interact with the faculty and research scholars working on nanoferrites at Shoolini University. This session was highly engaging, with students asking questions about the challenges of scaling up the synthesis of nanoferrites, their applications in real-world industries, and the latest advancements in nanotechnology.

Some of the key points discussed during the interactive session included:

- The applications of nanoferrites in magnetic storage devices, MRI contrast agents, and environmental cleanup technologies.
- The advantages of the sol-gel method over other synthesis methods, such as its ability to produce uniform particles with controlled size and shape.
- The challenges in optimizing the magnetic properties of nanoferrites for specific applications.

Tour of Research Facilities:



The students were given a tour of the state-of-the-art research laboratories at Shoolini University. They were introduced to the various instruments used for advanced research in

nanotechnology, including transmission electron microscopes (TEM), atomic force microscopes (AFM), and other cutting-edge equipment. This exposure provided them with a better understanding of the tools required for conducting high-level research in nanomaterials

Reflection and Feedback:

Towards the end of the visit, the students gathered for a reflection session, where they shared their thoughts on the experience. Many expressed their excitement at being able to witness the synthesis process firsthand and interact with experts in the field. The visit had not only deepened their theoretical knowledge but also sparked interest in pursuing further research in nanotechnology.

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Workshop funded by: DBT Star College Scheme, Centre of Excellence, Govt. College Sanjauli-06