

Experimental report

01/08/2026

Proposal: EASY-1507

Council: 4/2025

Title: Hysteresis characterization in a magnetic phase transition of FeWO₄

Research area: Materials

This proposal is a new proposal

Main proposer: Javier GONZALEZ PLATAS

Experimental team:

Local contacts: Laura CANADILLAS DELGADO

Samples: FeWO₄

Instrument	Requested days	Allocated days	From	To
D20	4	4	11/09/2025	12/09/2025

Abstract:

We aim to accurately characterize the magnetic transition temperature of the FeWO compound, as we have observed a noticeable degree of thermal hysteresis. In particular, during experiment 5-25-294, the magnetic transition appeared to occur 15–20 K earlier upon heating than the transition temperature commonly reported in the literature. This discrepancy suggests the presence of hysteresis behavior that has not been fully addressed in previous studies. To investigate this phenomenon in detail, we propose to perform systematic thermodiffractograms measurements during both heating and cooling cycles within the temperature range of 90–50 K. These measurements will help us determine whether the observed hysteresis is intrinsic to the material or influenced by external factors such as measurement conditions or sample preparation.

Experimental Report

ID Experiment:	Easy-1507
Title:	Hysteresis characterization in a magnetic phase transition of FeWO ₄
Instrument:	D20
Local contact:	Canadillas Delgado, Laura
Main Proposer:	Javier Gonzalez Platas
Home Institution:	Universidad de La Laguna. Departamento de Física
Visit days:	
Report submission Date:	

Abstract

We aim to accurately determine the magnetic transition temperature of FeWO₄, given the clear evidence of thermal hysteresis. In experiment 5-25-294, the transition was observed to occur 15–20 K earlier upon heating than values reported in the literature, suggesting previously unaddressed hysteresis effects. To investigate this behavior, we propose systematic thermodiffractogram measurements during both heating and cooling cycles in the 50–90 K range. These experiments will clarify whether the hysteresis is intrinsic to the material or arises from external factors such as measurement conditions or sample preparation.

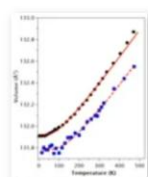
Experimental Report

The allocated beamtime allowed us to perform a new set of more precise measurements, which have ruled out the hysteresis effect observed in the previous experiment that motivated the present proposal. This new dataset also enables us to carry out the thermal expansion study of this compound, one of the original objectives outlined in the earlier proposal. Furthermore, the results obtained have already contributed to a recent publication based on data acquired within this project.

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Thermal expansion of FeWO₄ (ferberite) and FeWO₄:Fe₂WO₆ (7:1): a comparative X-ray and neutron diffraction study

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Temperature-dependent single-crystal X-ray, powder X-ray and neutron diffraction measurements reveal the thermal expansion behavior of FeWO₄ from 2 to 1123 K. Significant differences between natural ferberite and a FeWO₄:Fe₂WO₆ composite highlight the influence of multiphase and microstructural effects on derived thermoelastic parameters.

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