



Contribution ID: 1

Type: PIC2 Project

Quantitative and qualitative methods in elemental analysis via X-Ray fluorescence for materials' characterization

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This project focused on the initial work and methodology for a thesis project on the qualitative and quantitative elemental analysis of alumina (Al_2O_3) crystals doped with various elements, using Energy Dispersive X-ray Fluorescence (EDXRF). The broader thesis aims to adapt and optimize the existing X-ray fluorescence setup at FCUL to identify and quantify dopants within alumina crystals as accurately as possible. Initial measurements showed accurate characterization of metallic samples with higher atomic numbers, while challenges remain in reliably detecting lower atomic number elements such as aluminum ($Z=13$) and sulfur ($Z=16$). A characterization of the incident radiation field was performed to better understand its interaction with the samples and improve measurement accuracy. Future work will focus on implementing advanced analytical software tools and Monte Carlo simulations to enhance data analysis and validate experimental results, as well as exploration of alternative processes to X-ray fluorescence in order to reduce disperse radiation.

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