

# Non-destructive method for bulk chemical characterization of olivine chondrules

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**Abstract.** Ever since asteroids were discovered, they've been seen as remains of planetary formation, because they registered the processes that occurred in the origin of the Solar System in the same way that Earth's history is studied from geological registry. Chondrites represent unique study objects because the materials conserved in them were formed during the early stages of the Solar System. The purpose of this work is to develop a bulk chemical characterization of olivine chondrules in an unclassified chondrite based on the non-destructive X-ray fluorescence (XRF) analysis using the SANDRA portable equipment<sup>1</sup> at the National Research and Conservation Science Laboratory of Cultural Heritage (LANCIC-IF) in Mexico City. We estimated magnesium number (#Mg) for each chondrule with their MgO and FeO concentrations. These values range from 72.1 to 79.0, reported for type II chondrules which are FeO-rich<sup>2</sup>, presents in poorly metamorphosed chondrites. Even though this technique cannot yet substitute more advanced ones, it will be a quick and simple non-invasive way to analyze the chemical bulk composition. Therefore, this technique represents an excellent opportunity to the study and conservation of very important materials in the meteorite field and planetary sciences.

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<sup>1</sup> Ruvalcaba S., J.L. et al. *X-RaySpectrom*, 39, 338–345 (2010).

<sup>2</sup> McSween H. *Geochimica et Cosmochimica Acta*, 41, 1843–1860 (1977).