

Monday, 2nd October 2023

at 16:15 Studer Auditorium, 2 OG

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“Hydrated borates at extreme conditions: paving the way to innovative neutron-shielding Sorel concretes ”

Hydrated borates constitute a class of minerals characterized by clusters or chains of boron atoms, arranged in either tetrahedral or planar trigonal groups. Boron-bearing minerals have been designated as critical raw materials by the European Union, serving as the primary source of boron—a critical element extensively utilized across various industrial sectors. Furthermore, borates are recognized as a cost-effective alternative to boron carbide (B_4C) in the production of neutron radiation-shielding concretes.

In recent years, our research has encompassed an array of studies, focusing on the comprehensive characterization of this mineral class, even under non-ambient conditions. Our primary objective has been the development of efficient and cost-effective Sorel concrete tiles. These investigations have unveiled numerous phase transitions occurring at high-pressure and high-temperature conditions, highlighting the crucial role of the hydrogen bond network in maintaining the stability of the crystalline structure.

This presentation seeks to provide a comprehensive overview of the current state-of-the-art research on hydrated borates. It will cover a range of topics, including crystallographic studies, experiments involving neutron absorption, and exploitable ore deposits in Europe.