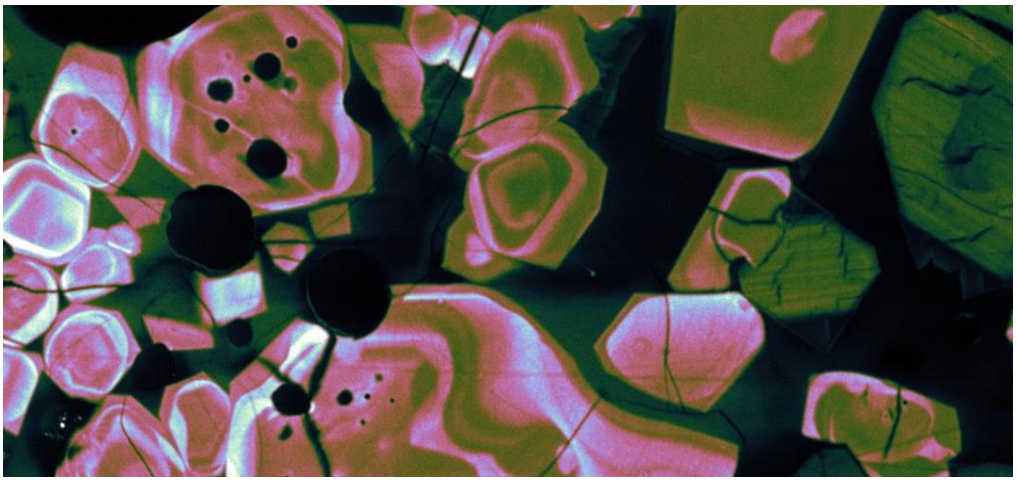
Cathodoluminescence

Common Research Service (SCR)



Unraveling early solar protoplanetary disk evolution using high resolution cathodoluminescence images

A new Vision on the primitive objects of the solar system

To understand the first stages of the formation of the solar system has always animated the community of physicists, astrophysicists and cosmochemists. In this research, the analysis of the main constituents of so-called primitive meteorites represents a major challenge in view of their potential role as witnesses of the mechanisms that occurred in the first 5 million years of the life of our solar system. To gather multidisciplinary knowledge and know-how becomes a decisive asset. Thanks to the use of high sensitivity cathodoluminescence (CL), new internal structures have been observed in olivines (Mg_2SiO_4), one of the constituents of meteorites. This study makes it possible to highlight a mechanism of epitaxial growth of these objects at high temperature. The very high sensitivity acquired on the images of CL brings a new light on the formation of olivines. These results and their many implications have been published on July 11, 2018 in Science Advances.

Breakthroughs

For the first time, the use of a cathodoluminescence system, suitable for the analysis of semiconductor structures, allowed access to an unmatched level of reading, up to now, to the fine structure of extraterrestrial olivines.

Collaboration : Laboratoire Lagrange (UMR 7293/Observatoire de la Côte d'Azur, Nice)

More information : « Chondrules as direct thermochemical sensors of solar protoplanetary disk gas», Science Advances, 11 Jul 2018 Vol. 4, no. 7, eaar3321 DOI: 10.1126/sciadv.aar3321

Contact: Marc Portail – mpo@crhea.cnrs.fr – 04 93 95 42 02