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#ICMolTalks

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June 17th - 10:30h

SS6 Seminario - ICMol

Abstract

Self-repairing high entropy oxides

Both experimental results and theoretical calculations are presented to demonstrate that high-entropy oxides are intrinsically capable of undergoing an autonomous self-repairing process. In such materials, the energy stored in the metastable state during crystal growth (characterised by high configurational entropy) can promote the self-repairing process due to the gradient in enthalpy. The self-repairing allows such materials to regrow and repair at tens of nanometer scale. Density functional theory calculations reveal that the extra enthalpy stored in the metastable high entropy materials can be released to effectively heal macroscopic defects. This extraordinary self-repairing phenomenon makes these high entropy oxides highly desirable as coating, enabling structures used in harsh environments to better withstand damage from, such as cosmic irradiation in space, nuclear irradiation in nuclear power facilities, or tribological impact.

Biography

Professor Zongwen Liu received his PhD degree from the University of Melbourne. After his PhD, he worked at the University of Queensland and then at the National Institute for Materials Science in Japan before joining the University of Sydney in 2004. At Sydney, he initially worked at the Australian Centre for Microscopy and Microanalysis where he was awarded a Queen Elizabeth II Fellowship, and he then worked in the School of Chemical and Biomolecular Engineering as an associate professor and a full professor.

Education/ Experience:
PhD 1999, University of Melbourne: Condensed Matter and Transmission Electron Microscopy
BSc (Hon) 1986, Lanzhou University: Condensed Matter Physics

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