

European Union supports research of Max Planck material scientist

Dr. Baptiste Gault wins Consolidator Grant of European Research Council

The European Research Council (ERC) awarded a Consolidator Grant of 2 million euros for five years to Dr. Baptiste Gault, leader of the Atom Probe Tomography group at the Max-Planck-Institut für Eisenforschung. In his research project “SHINE – Seeing Hydrogen In Matter”, Gault will seek to provide three-dimensional hydrogen mapping at near-atomic scale in metallic alloys and materials for hydrogen storage. “I am aiming to improve the understanding of hydrogen embrittlement to design better engineering alloys and develop functional materials for low-carbon emission power”, explains Gault. The team of Max-Planck scientists will use a correlative microscopy and spectroscopy approach combined with atomistic simulations in order to provide a mechanistic understanding of hydrogen behaviour in materials. Atom probe tomography will be at the core of SHINE and Dr. Gault plans to develop the hardware and data-mining methods to maximise data quality.

Previous approaches to determine the origin of hydrogen in a material through atom probe tomography were limited by the presence of a residual partial pressure of H in the analysis chamber. The new approach will use an ultrahigh vacuum cryogenic transfer which connects two state-of-the-art atom probe microscopes with a scanning electron microscope fitted with a xenon-plasma gun. Through a precise control of H-loading into the specimen, the quality of the data will be enhanced drastically while at the same time using data mining and machine learning techniques for data interpretation. This Big Data approach will be supported by the MPIE’s Computational Materials Design department. Through SHINE, Gault will be able to determine how hydrogen moves through metallic or nanoporous structures and how H gets trapped thus setting up manufacturing strategies for the enhancement of the performance and durability of engineering materials.

Dr. Baptiste Gault joined the MPIE in 2016, leading the Atom Probe Tomography group. Prior to this, and following a PhD in Physics at the University of Rouen, France, granted in 2007, he occupied various postdoctoral positions at The University of Sydney, Australia, was a Marie Curie Research Fellow at the University of Oxford, UK, and became assistant professor in Structural Materials Characterisation at the McMaster University in Canada in 2012. Over 2013-2015, he had a break in his research career, where he worked as senior publisher in the Material Science group at Elsevier Ltd in Oxford, UK. He is currently a member of the Steering Committee of the International Field Emission Society that oversees the Atom Probe community, and an Associate Editor of *Acta Materialia*.

The grants of the European Research Council are amongst the most prestigious international research grants. The Consolidator Grants are given to scientists who have demonstrated an excellent track record of research achievements, and obtained their

PhD seven to twelve years ago. 2538 scientists have applied to this application round, 329 have been chosen European wide. 55 researchers are from Germany, 11 from North-Rhine Westphalia, which was the most successful compared to the other federal states.



Max-Planck scientist Dr. Baptiste Gault was awarded with the Consolidator Grant of the European Research Council for his research about hydrogen mapping. Advanced characterization techniques such as atom probe tomography as seen in the photo, will be used.
Copyright: Max-Planck-Institut für Eisenforschung GmbH

The Max-Planck-Institut für Eisenforschung GmbH (MPIE) conducts basic research on metallic alloys and related materials to enable progress in the fields of mobility, energy, infrastructure, medicine and safety. It is financed by the Max-Planck Society and the Steel Institute VDEh. In this way, basic research is amalgamated with innovative developments relevant to applications and process technology.

Contact:

Yasmin Ahmed Salem, M.A.
Press and Public Relations Officer
E-Mail: y.ahmedsalem@mpie.de
Tel.: +49 (0) 211 6792 722
www.mpie.de

