

Title:

Seeing hydrogen in materials by using Atom Probe Tomography

Abstract:

The presence of hydrogen in metallic materials can cause catastrophic early fracture that is known as hydrogen embrittlement. Observing the hydrogen and its associated influences in microstructure has been a grand challenge that limits the development of a solution to this problem. To this end, our research group have developed a special tool, cryogenic atom probe tomography (cryo-APT), for hydrogen mapping and applied it in combination with a micromechanical approach to investigate hydrogen embrittlement in steels. Our efforts have led to new insights for deciphering hydrogen trapping and embrittling mechanisms in steels, facilitating the development of the steel microstructure that has a good resistance to hydrogen embrittlement.

Bio:

Dr Yi-Sheng (Eason) Chen is a Nanyang Assistant Professor (NAP) and Singapore National Research Foundation (NRF) Fellow at the School of Materials Science and Engineering, Nanyang Technological University, Singapore (NTU). His research focuses on materials characterisation, metallurgy, and hydrogen technologies. He specialises in using advanced microscopy techniques such as atom probe tomography (APT) and electron microscopes to develop the structure-property-processing relationship of advanced metallic materials. The insights gained from these endeavours will contribute to a deeper understanding of material behaviour, paving the way for the development of next-generation high-performance materials. He is a former research assistant at the Institute of Physics, Academia Sinica.



References:

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