

## NOVEL IN SITU NANOMECHANICAL TESTS: A NEW INSIGHT INTO THE HYDROGEN EMBRITTLEMENT

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Hydrogen embrittlement is a complicated process hard to investigate due to the volatile nature of the hydrogen atom and different states it can exist in the metals. Therefore, to reveal the underlying mechanism of the hydrogen embrittlement, we designed and performed “critical experiments.” In this paper, we will present some of our novel approaches used to study the hydrogen embrittlement in different alloy systems. We specifically used in situ hydrogen charging combined with nanoindentation, microcantilever bending, and tensile testing to observe the hydrogen embrittlement at various microstructural length scales. Additionally, we used high-resolution microstructural characterization techniques including, High-resolution Electron Backscattered Diffraction (EBSD), Electron Channeling Contrast Imaging (ECCI), transmission EBSD (t-EBSD) and Transmission Electron Microscopy.

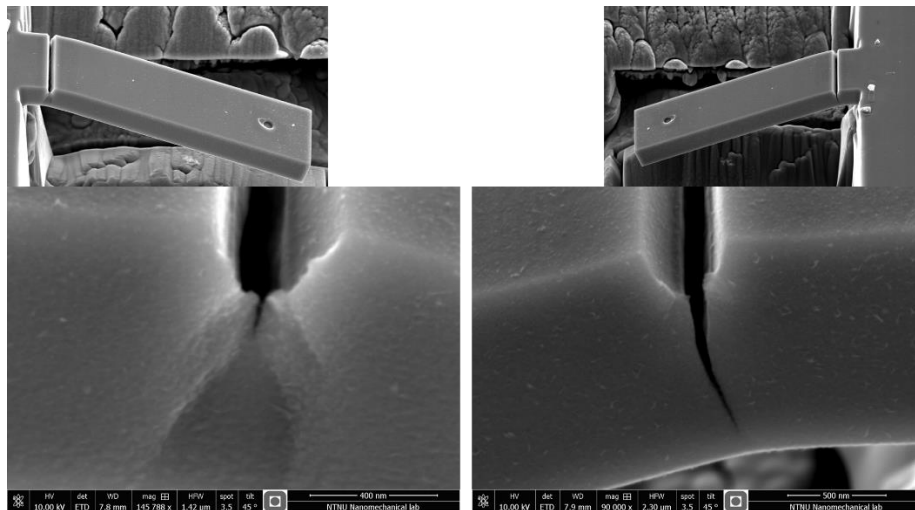


Figure 1 – Cantilevers tested with (right) and without hydrogen (left)