A New Approach to Discovering the Fundamental Mechanisms of Environmental Fracture

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Controversy still exists between the proposed mechanisms for hydrogen embrittlement, part of this stemming from the lack of information of what occurs ahead of the crack tip. This work seeks to answer the question of what is occurring to the microstructure by employing techniques such as focused ion beam machining to enable examination of the microstructure immediately beneath the fracture surface. Different cases of environmental embrittlement conditions are examined to show that conclusions of the microstructure beneath the fracture surface cannot be made by classical fractography alone. The insight gained from these studies suggests that we need to refine hydrogen embrittlement models.