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ADVANCES IN MODELING HYDROGEN-ASSISTED FRACTURE PHENOMENA

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ABSTRACT

Hydrogen-assisted fracture phenomena have been a longstanding concern in various industrial and energy sectors. With the increasing interest in hydrogen as a future energy source, it is crucial to understand the risks it poses to the structural integrity and fatigue life of components. The transport of dissolved hydrogen atoms within a component's bulk and their entrapment in microstructural defects leads to dramatic reductions in the material's ductility, fracture toughness and fatigue crack growth resistance, through a phenomenon termed *hydrogen embrittlement*.

This mini-symposium aims to explore the latest advancements in multi-physics modelling approaches for predicting hydrogen-assisted fracture phenomena. By bringing together researchers and industry experts, we seek to foster collaboration and exchange ideas to address the challenges associated with understanding and mitigating hydrogen-assisted cracking phenomena, across relevant scales and operating conditions. Particular emphasis is placed on the use of advanced computational fracture mechanics techniques such as continuum damage models, cohesive zone approaches and phase field modelling (see, e.g., [1,2] and Refs. therein). Additionally, the mini-symposium highlights the noteworthy advancements in innovative testing methodologies aimed at facilitating the assessment of hydrogen-assisted fractures in technologically-relevant scenarios, and their combination with advanced modelling techniques.

REFERENCES

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