Special Issue

Review on the Mechanical Behavior of Metallic Materials under Hydrogen Environment – Experiment and Simulation

Message from the Guest Editor

To reduce green house gas emissions and hydrogen plays a predominant role in this strategic vision. From an engineering point of view, it is known for over one century that hydrogen deteriorates the mechanical properties of most structural metallic alloys, especially steels, also known as “hydrogen embrittlement”. Although the fundamental understanding of the hydrogen embrittlement phenomenon has increased over the years, and especially within the last 20 years, there are still fundamental questions to be answered. In order to assess the safe use of components especially in gaseous hydrogen environments, this special issue seeks the submission of review papers describing the current knowledge especially in the following fields: Influence of environmental parameters (e.g. pressure, temperature, gas purity) on mechanical properties; Influence of test parameters (e.g. strain rate, frequency) on mechanical properties; Influence of microstructure on physical (e.g. diffusivity, permeability, trapping) properties; Embrittlement mechanisms; Simulation methods; Standardization of materials testing; Standardization of component design for use in H2 applications

Guest Editor

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Message from the Editorial Board

Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

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