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Study of Hydrogen-Induced Cracking in Metals and Alloys

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Message from the Guest Editors

Dear Colleagues,

As in recent years, the strength of structural materials increases dramatically. Hydrogen embrittlement attracts more and more attention. Hydrogen embrittlement has been considered to limit the safe use of high-strength steels. There are several concepts to explain how hydrogen leads to the failure of steels and alloys. However, the loss of ductility due to hydrogen remains a serious problem for the design and fabrication of high-strength steels. For some steels, their well-balanced strength and ductility are achieved by a transformation-induced plasticity effect (TRIP). Hydrogen can move due to the transformation process, resulting in localized hydrogen-rich areas. If there are “traps”, hydrogen losses its mobility. As a result, crack initiation due to hydrogen can be inhibited.

Recently, there have been some advanced techniques to observe the interaction between hydrogen and metal microstructures in a more detailed manner. This Special Issue will focus on the study of hydrogen embrittlement via advanced techniques, machine learning methods, etc. for advanced alloys and high-strength steels.

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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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