Preface to the Special Issue on “Creation of Hydrogen-passive Surfaces on Steels to Prevent of Hydrogen Embrittlement”

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With the recent increasing demands for high-strength steels to reduce energy and resource use in automobile and construction, reduction in susceptibility to hydrogen embrittlement of the steels become important to ensure reliability and safety. There are many researches focused on structure and composition to reduce the susceptibility of hydrogen embrittlement. Corrosion, however, plays an important role in hydrogen generation, inducing the hydrogen embrittlement. From the surface electrochemical reaction point of view, one idea to mitigate hydrogen embrittlement is to create surfaces with prevent the entry of hydrogen into the steels, hydrogen-passive surfaces. To achieve the creation of hydrogen-passive surfaces, it is essential to understand detail of the hydrogen entry process considering the properties of surfaces and interfaces. Therefore, research group of Comprehensive Understanding of Hydrogen-passive Surface on Steels for Prevention of Hydrogen Embrittlement in The Iron and Steel Institute of Japan, is working.

The research group makes arrangement for ISIJ International, Special Issue on the “Creation of hydrogen-passive surfaces on steels to prevent of hydrogen embrittlement”. This special issue includes for resent research results of the research group, and original research papers and review papers about the prevention of hydrogen embrittlement of high-strength steels, especially addressing the hydrogen entry process highlighting interface phenomena.