Gaseous Hydrogen Embrittlement of Materials in Energy Technologies: Mechanisms, Modelling and Future Developments (Woodhead Publishing Series in Metals and Surface Engineering)

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Many modern energy systems are reliant on the production, transportation, storage, and use of gaseous hydrogen. The safety, durability, performance and economic operation of these systems is challenged by operating-cycle dependent degradation by hydrogen of otherwise high performance materials. This important two-volume work provides a comprehensive and authoritative overview of the latest research into managing hydrogen embrittlement in energy technologies.

Volume 2 is divided into three parts, part one looks at the mechanisms of hydrogen interactions with metals including chapters on the adsorption and trap-sensitive diffusion of hydrogen and its impact on deformation and fracture processes. Part two investigates modern methods of modelling hydrogen damage so as to predict material-cracking properties. The book ends with suggested future directions in science and engineering to manage the hydrogen embrittlement of high-performance metals in energy systems.

With its distinguished editors and international team of expert contributors, Volume 2 of Gaseous hydrogen embrittlement of materials in energy technologies is an invaluable reference tool for engineers, designers, materials scientists, and solid mechanicians working with safety-critical components fabricated from high performance materials required to operate in severe environments based on hydrogen. Impacted technologies include aerospace, petrochemical refining, gas transmission, power generation and transportation.

- Summarises the wealth of recent research on understanding and dealing with the safety, durability, performance and economic operation of using gaseous hydrogen at high pressure
- Chapters review mechanisms of hydrogen embrittlement including absorption, diffusion and trapping of hydrogen in metals
- Analyses ways of modelling hydrogen-induced damage and assessing service life

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