

**Anomalous Behaviour in Hydrogen Diffusion through such
Hydride-Forming Electrodes as Palladium and
Metal-Hydrides**

Pd과 금속 수소화물과 같은 수소화물 형성 전극을 통한 수소
확산의 비이상적 거동에 관한 연구

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Hydrogen transport through hydride-forming metals and alloys has been routinely investigated by using potentiostatic current transient technique (chronoamperometry), under the assumption that the electrode is homogeneous and hydrogen transport through such electrode is purely controlled by hydrogen diffusion. However, various kinds of anomalous behaviour in hydrogen transport have been quite frequently reported by many researchers. This review provides a comprehensive survey of the anomalous behaviours of hydrogen transport observed in such hydride-forming electrodes as Pd and metal-hydrides. The topics related to the rate-controlling steps of hydrogen transport are first reviewed. In particular, it is shown that the diffusion-controlled model should be no longer valid in case hydrogen diffusion is coupled with either interfacial charge transfer or hydrogen transfer reaction. Subsequently, the anomalous behaviours due to hydrogen diffusion in the presence of traps and in the coexistence of two hydride phases are discussed in detail. Each of the anomalous hydrogen transport models suggested is theoretically described with the mathematical expression for the current transient, and then is exemplified by hydrogen extraction from the Pd or metal-hydrides in aqueous solutions.

References

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