

Study and development of fluorinated hydrogen storing alloy catalyst

The fluoridation technology of a hydrogen storing metal alloy is the surface treatment technology of aiming at improvement in the following performances, by making the meshes-of-a-net-like structure constituted by the fluoridation thing form on the surface very much at the same time it removes the oxide on the surface of a metal hydrogenation thing.

(1) Hydride reaction characteristic; -- (2) Electrochemistry characteristic; -- (3) Impurities tolerance; -- (4) Long-term durability

The fluoridation processing method is the know-how into which we developed in 1991 and it has developed in about ten years as various kinds of fluoridation processing technology corresponding to the practical use purpose. As a new applicable field in the present hydrogen storing metal alloy, the research and development as electrode of the catalyst for a hydrogen generating reaction as hydrogen supply equipment to a fuel cell or a direct type fuel cell are done in the energy system which used liquid hydride fuel. In these uses, it is becoming clear that hydrogen storing metal alloy fluorinated alloy shows the performance, which was excellent with improvement in various characteristics by fluoridation though it was comparatively cheap. Generally it is known that the precious metals, such as Pt, Pd, and Ru, have high activity for various hydride reaction and a dehydride reaction reaction. Also in the system, which uses liquid hydride fuel, it is known, as a catalyst for hydrogen generating that activity of the precious metals is high.

However, if from the practical consideration, as a result of the cost limit as well as the natural resource scarcity should pursue the use in the fuel cell domain by the low cost more general metal underlie catalyst. The Mg_2Ni alloy catalyst which we developed is carrying out fluoridation of this, although it is the alloy well known as a hydrogen storing metal alloy, and it turns out in the hydrogen generating reaction of liquid hydride fuel that it has a high catalyst performance. As compared with the untreated one, when the Mg_2Ni alloy is fluorinated and $F-Mg_2Ni$ and $F-Mg_2NiH_x$ are formed, the improvement in the untreated one several times of the hydrogen generating ratio is found, because based on change of surface structure, and the knowledge that this is the hydrogen generating function which was excellent in Pt known as a catalyst kind from the former, Pd, Ru, etc. and the row serves as a base of research and development (Figure). As the catalyst which will be used for a hydrogen generating reaction if the price of a metal called Mg and Ni which constitute the Mg_2Ni alloy, and the precious metals, such as Pt and Ru, is compared -- very -- low -- it is possible to become cost The usage as a catalyst is considered now (担持 and fixation, the contact method with fuel, etc.). As a product object, research and development is done about the hydrogen supply system for a fuel cell, and the use supposing the object for stationing use of a fuel cell will be expected to be in the future and which is an object for pocket electric devices, or about 1kW.