PtRu-Modified Alkaline Leached Cu/Ni/NiZn Deposits as Cathode Materials for Hydrogen Production*

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Since the fossil fuel sources are being depleted it is vital for human to find alternative energy sources to maintain the current life standards. Many scientists agree that the solution to these global problems would be to replace the existing fossil fuel system by the hydrogen energy system [1]. Although there are some production methods, hydrogen gas can be produced in large quantities by water electrolysis. However, cost and energy consumption, which are directly proportional to cell voltage, are currently high. Efforts are being devoted to develop new electrode materials and reduce the cost of electrolytic hydrogen. The nickel-based alloys prepared by leaching out the active component are effective catalysts for hydrogen production [2, 3]. The activities of these electrodes could be further increased by incorporation of noble metals [4, 5].

In this study, the Raney-type NiZn coatings were modified by the binary PtRu deposits and tested as cathode materials for the alkaline water electrolysis. It was found that the PtRu-modified layers have porous structures with relatively low Pt and Ru chemical compositions. The modification of the alkaline leached Cu/Ni/NiZn surface by Pt and/or Ru enhances the electrochemical activity of the electrode. The enhanced hydrogen evolution activity was explained by the porous surface and/or a possible synergistic effect between the metals.

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Figure. SEM images and EDX spectrum of PtRu-Modified Cu/Ni/NiZn.

References

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