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能源和环境工程

TiO_2-Pt/Mm（$Ni_{3.4}Mn_{0.4}Al_{0.3}Co_{0.7}$）电极的可助光充电

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摘要

1～8 nm的Pt微粒通过光催化分解法沉积在20～50 nm的TiO_2微粒表面，然后把所制备的TiO_2-Pt纳米微粒修饰到富La的贮氢合金电极的表面，形成可助光充电的TiO_2-Pt/Mm（$Ni_{3.4}Mn_{0.4}Al_{0.3}Co_{0.7}$）电极（TPM电极），研究了TPM电极的光电化学、可助光充电行为。结果表明：微小的电流对TPM电极的光充电效应有较强的辅助作用。当TPM电极只被光照时，放出的电量较小;而在光照的同时加上一个微弱的电流，可显著改善其光充电性能。通过交流阻抗谱和循环伏安实验研究了其光充电机理。

关键词

光充电 光电化学 贮氢合金 二氧化钛 表面修饰

分类号

Photo-assisted chargeability of TiO_2-Pt/Mm（$Ni_{3.4}Mn_{0.4}Al_{0.3}Co_{0.7}$）electrode

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Abstract

A photo-chargeable TiO_2-Pt/Mm（$Ni_{3.4}Mn_{0.4}Al_{0.3}Co_{0.7}$）electrode（TPM electrodes）was prepared by using a hydrogen storage alloy［Mm（$Ni_{3.4}Mn_{0.4}Al_{0.3}Co_{0.7}$）］sheet modified with TiO_2-Pt nanoparticles prepared by the photo-assisted deposition method.The photo-electrochemical properties and the photo-chargeability of TPM electrode were investigated.The results showed that the TPM could be charged by light with the aid of electric current.But the discharge content of the TPM electrode illuminated only was very small in contrast with the electrode charged by light and electric current.The mechanism was explained by the results of the cyclic voltammogram and electrochemical impedance spectrum of the TPM electrode with or without illumination.

Key words

photo-chargeable photo-electrochemical hydrogen storage alloy titania surface modification

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