

Research Topic	Fabrication of CuInS ₂ photoelectrode	Graduate School of Engineering
Host University	East China University of Science and Technology / Shanghai / China	Applied Chemistry, Environmental and Biomedical Engineering
Duration	From September 2 to October 8, 2019	MATOBA Kuniaki

Summary of the Research Activities

Artificial photosynthesis by using photoelectrodes under solar light irradiation has attracted a lot of attention recently. Among these photoelectrodes, CuInS₂ (CIS) has been extensively studied since they have fascinating properties.

To begin with, I fabricated the CIS photoelectrode by using spin coating method and structural analysis was conducted by UV-Vis, SEM, XRD spectroscopies. From UV-vis absorption spectra (Fig. 1), absorption increased as the number of coating times increased.

Next, I performed measurements of photoelectrochemical (PEC) properties. In order to improve PEC properties, CdS and Pt deposition was performed onto CIS photoelectrode. CIS showed low anodic photocurrent. And, although Pt/CIS (Pt deposition onto CIS) exhibited that anodic photocurrent increased as the number of coating times increased (3 times is maximum. Fig.2), dark current also appeared. On the other hand, Pt/CdS/CIS (CdS and Pt deposition onto CIS) exhibited that the current increased compared to Pt/CIS at any number of coating times, and that the dark current was also reduced (3 times is maximum. Fig.3). It seems that the improvement of PEC properties are attributed to the defect site being compensated by CIS and CdS.

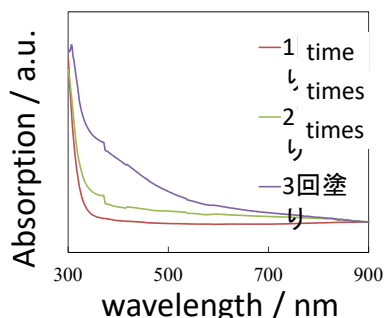


Fig. 1 UV-vis absorption spectra of CIS

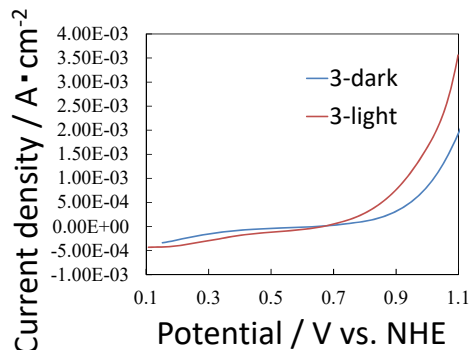


Fig. 2 Photocurrent of Pt/CIS (3 times coating)

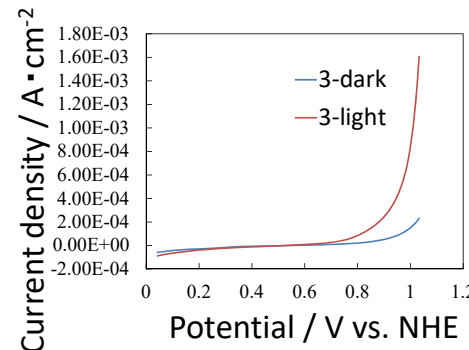


Fig. 3 Photocurrent of Pt/CdS/CIS (3 times coating)

College Life, Friends and Foods

I stayed East China University of Science and Technology in China for a month. I had a good time and various experiences. For example, Chinese friends invited me for dinner and we ate Peking duck etc. Moreover, I played badminton and cards with Chinese friends. Also, I went sightseeing such as Shanghai tower and people square. Through this project, I felt that international interact is so fun and important. I want to go to foreign country again.



指導教員講評

異国での研究成果、生活において、充実した留学生活が送れた様子が伺えました。今回の留学で得られた体験を活かし、更なる発展を期待します。
指導教員氏名：東本信也