

## Fabrication and Characteristics of C(IG)(SeS)<sub>2</sub> Absorbers by Selenization and Sulfurization

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Cu(InGa)(SeS)<sub>2</sub> (CIGS) thin film solar cells have recently reached an efficiency of 20%. Recent studies suggest a double graded band gap structure of the CIGS absorber layer to be a key issue in the production of high efficiency thin film solar cell using by sputtering process method. In this study, Cu(InGa)(SeS)<sub>2</sub> absorbers were manufactured by selenization and sulfurization, we have deposited CIG precursor by sputtering and Se layer by evaporation before selenization. The objective of this study is to find out sulfurization effects to improve Voc and to compare with non-sulfurization Cu(InGa)Se<sub>2</sub> absorbers. Even if we didn't analysis Ga depth profile of Cu(InGa)(SeS)<sub>2</sub> absorbers, we confirmed increasing of Eg and Voc through sulfurization process. In non-sulfurization Cu(InGa)Se<sub>2</sub> absorbers, Eg and Voc are 0.96eV and 0.48V. Whereas Eg and Voc of Cu(InGa)(SeS)<sub>2</sub> absorbers are 1.16eV and 0.57V. And the efficiency of 9.58% was achieved on 0.57cm<sup>2</sup> sized SLG substrate. In this study, we will be discussed to improve Eg and Voc through sulfurization and the other method without H<sub>2</sub>S. gas.

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