

## Quantification of $\text{Cu}(\text{In}_x\text{Ga}_{1-x})\text{Se}_2$ Solar Cell by SIMS

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The relative composition of  $\text{Cu}(\text{InGa})\text{Se}_2$  solar cells is one of the most important measurement issues. However, quantitative analysis of multi-component alloy films is difficult by surface analysis methods due to severe matrix effect. In this study, quantitative depth profiling analysis of CIGS films was investigated by secondary ion mass spectrometry (SIMS). The compositions were measured by SIMS using the alloy reference relative sensitivity factors derived from the certified compositions and the total counting numbers of each element. The compositions measured by SIMS were linearly proportional to those by inductively coupled plasma-mass spectrometry (ICP-MS) using isotope dilution method. In this study, the quantification measured by ICP-MS method is compared with the composition calculated by SIMS depth profiles with AR-RSFs obtained from the reference. The SIMS depth profile of CIGS thin films according to the manufacturing condition was converted into compositional depth profile.

**Keywords:** SIMS, Quantification, CIGS, Compositional depth profile