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Observation of defects in CuInSe₂ by 300kV aberration corrected scanning transmission electron microscope AKANE TAKESHITA, TAKAYUKI TANAKA, Tokyo Institute of Technology, TADAHIRO KUBOTA, Honda R&D Co., Ltd., HIDETO MIYAKE, Mie University, HIDETAKA SAWADA, YUKIHITO KONDO, Japan Electron Optics Laboratory, YOSHIFUMI OSHIMA, Osaka University, YASUMASA TANISHIRO, KUNIO TAKAYANAGI, Tokyo Institute of Technology — Vacancies (V_{Cu} , V_{In}) and substitutional atoms (In_{Cu} , Cu_{In}) in CuInSe₂ crystal, which is the key semiconductor material for thin film solar cell applications, were directly observed by 300kV aberration-corrected high angle annular dark field scanning transmission electron microscope (HAADF-STEM). The atomic columns of Cu, In and Se were independently observed from CuInSe₂ [100] crystal zone axis by HAADF-STEM. Some In and Cu columns showed reduced and increased intensities from that of column without defect, respectively. On the other hand, no defects in Se columns were observed. The intensity analysis suggests In substitution of Cu site (In_{Cu}) and Cu substitution of In site (Cu_{In}). The concentrations of Cu and In substitutions were evaluated based on comparison with the multi-slice calculation.

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