Contribution ID: **105** Type: **Poster contribution**

Cu/Zn disorder in Cu2ZnSn(SxSe1-x)4 monograins: the result of “ordering”procedure

Kesterite-type based thin film solar cell technologies are mainly based on polycrystalline absorber layers. A promising low cost alternative technology uses Cu2ZnSn(S,Se)4 (CZTSSe) monograins (single crystals of 50-100 µm size) which are fixed in a polymer matrix to form a flexible solar cell [1].
It is agreed in literature that large band tailing observed in Cu-based kesterite-type semiconductors causes voltage losses limiting the efficiency of kesterite-based devices. The Cu/Zn disorder (CuZn and ZnCu anti-sites in Cu-Zn planes at z=¼ and ¾), which is always present in these compounds [2], is discussed as a possible reason for band tailing.
The experimental determination of the order parameter Q which is a quantitative measure of the degree of Cu/Zn disorder [3] requires a differentiation between the isoelectronic cations Cu+ and Zn2+. An in depth analysis of neutron diffraction data provides information on the cation distribution in the crystal structure allowing the determination of type and concentration of intrinsic point defects including a distinction between Cu and Zn [2]. On the other hand neutron diffraction requires large sample volumes, thus kesterite monograins offer the unique possibility to correlate structural disorder in kesterite-type absorbers with device performance parameters.
We will present a detailed structural investigation of the effect of the disordering procedure and the long low temperature –“ordering”annealing on the Cu/Zn disorder and optical properties of the CZTSSe monograins will be presented.

Primary author: GURIEVA, Galina (Helmholtz Zentrum Berlin)

Co-authors: Dr FRANZ, A; Dr LEVCENKO, S; MUSKA, K; Dr ERNITS, K; Prof. SCHORR, Susan (1. Helmholtz-Zentrum Berlin für Materialien und Energie; 2. Freie Universität Berlin, Department Geosciences)

Presenter: GURIEVA, Galina (Helmholtz Zentrum Berlin)

Session Classification: Energy materials: batteries, photovoltaics, etc.

Track Classification: Energy materials: batteries, photovoltaics, etc.