Electronic Supplementary Material (ESI) for RSC Advances.
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Supporting Information

A picture of the metal salt solutions A-D after aging for 1 day can be found in Fig. S1. In comparison to the picture in Fig. 1, the solutions B-D remain unchanged. However, in solution A the color has changed rapidly and also gelation has occurred, which makes it unfavorable for fabricating absorber layers in a reproducible way. In contrast, the clear solutions C and D are stable for several weeks.

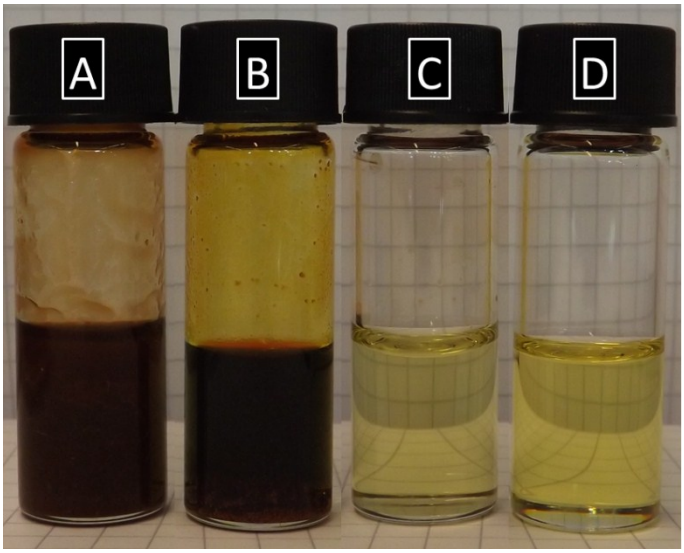

Fig. S1: Picture of the metal salt solutions A-D 1 day later than the picture in Fig. 1.

A more detailed view of the 112-reflexes of the samples A-D as measured by XRD can be found in Fig. S2. The different positions can be explained by different S/(S+Se)-ratios, the calculated values can be found in Table 1. The FWHM is increasing in the order A<B=C<D. For sample A, a less intense reflex at 27.3 ° is visible and indicates the presence of ZnSe.

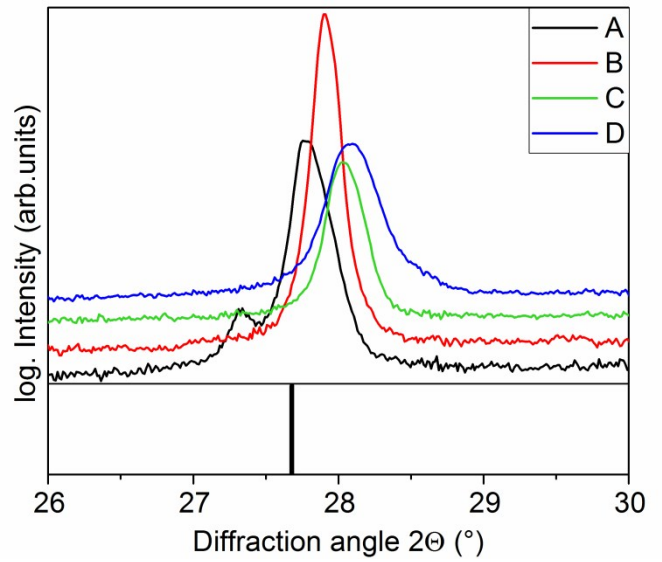

Fig. S2: Detailed view of the 112-reflex of absorbers prepared from metal salt solutions A-D as obtained by XRD and reference card JCPDS 052-0867 for CZGSe. The complete diffractogram can be found in Fig. 3.

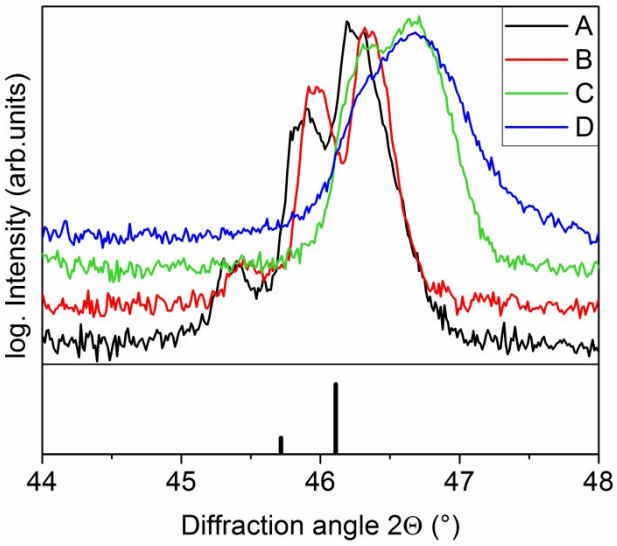

Fig. S3: Detailed view of the 220- and 204-reflex of absorbers prepared from metal salt solutions A-D as obtained by XRD and reference card JCPDS 052-0867 for CZGSe. The complete diffractogram can be found in Fig. 3.

A more detailed view of the 220- and 204-reflex as measured by XRD can be found in Fig. S3. For the samples A and C two separate reflexes are visible, whereas for the samples B and D only one broader reflex could be observed. The difference in diffraction angles is again due to the different S/(S+Se)-ratios. For sample A a less intense reflex at 45.3 ° is visible that corresponds to ZnSe.

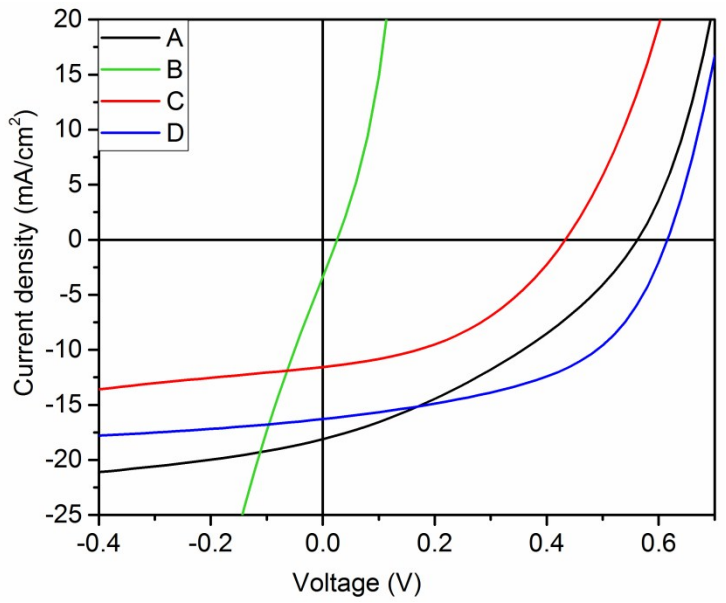

Fig. S4: J-V-characteristics of the best performing solar cells from the samples A-D under AM1.5G illumination.

The J-V-characteristics under AM1.5G illumination of the best-performing solar cells from the samples A-D can be found in fig. S4. Sample C is short-circuited, while the other samples have diode-shaped characteristics. The corresponding solar cell parameters can be found as maximum values in table 2.

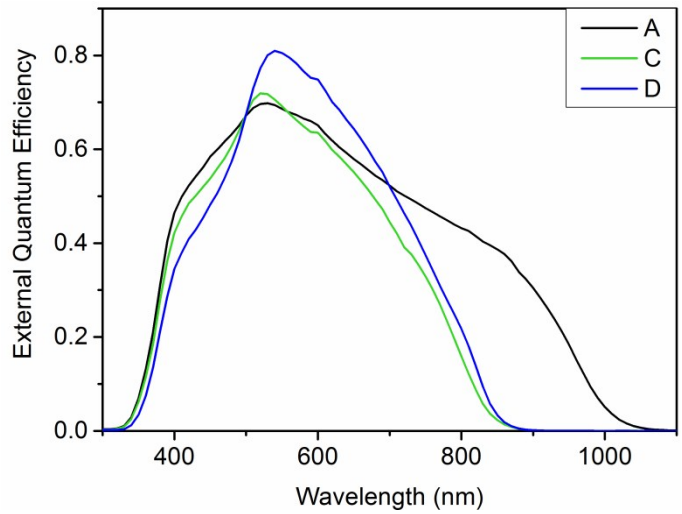

Fig. S5: External quantum efficiency (EQE) measurement of the samples A, C and D. Sample B was short-circuited and could therefore not be measured.

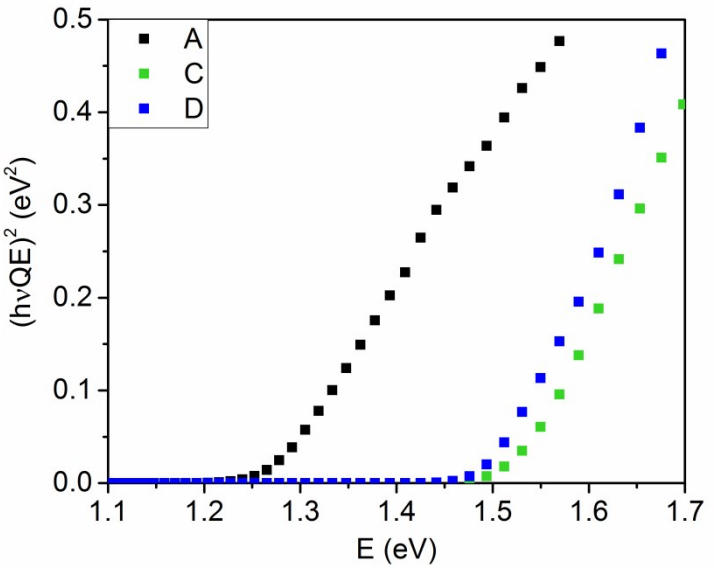

Fig. S6: Plot of the squared EQE versus the energy. The band gaps shown in Table 2 are estimated from a linear extrapolation of the measurements shown here.