# Zinc Selenide Stabilized in a Quadrilateral Network Characterized with Optical Emissions

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## Supplementary Data

**Figure S1** The (*hk*0) reflections for (a) the crystal **1·T** prepared by quenching at 630 °C and (b) the crystal **1** prepared by slow cooling to 400 °C.

**Figure S2** SEM images and EDS spectrum of single crystals for (a) $K_2Zn_{3.03(5)}Se_4$ (**1**) and (b) $K_2Zn_{2.56(2)}Mg_{0.46(5)}Se_4$ (**2**).

**Figure S3** Observed (black) and calculated (red) powder X-ray diffraction (PXRD) profiles along with the difference plots [Iobs-Icalc] (blue) of the Rietveld refinements for (a) $K_2Zn_3Se_4$ (**1**) with converged *Rwp* = 9.59% and GOF = 4.96, and (b) $K_2Mg_{0.5}Zn_{2.5}Se_4$ (**2**) with converged *Rwp* = 9.98% and GOF = 3.84.

**Figure S4** Differential thermal analysis of the powder samples in two cyclic runs for (a) **1** and (b) **2**.

**Figure S5** The UV-vis-NIR reflectance spectrum of (a) **1** and (b) **2**.

**Figure S1** The (*hk*0) reflections for (a) the crystal **1**·**T** prepared by quenching at 630 °C and (b) the crystal **1** prepared by slow cooling to 400 °C.

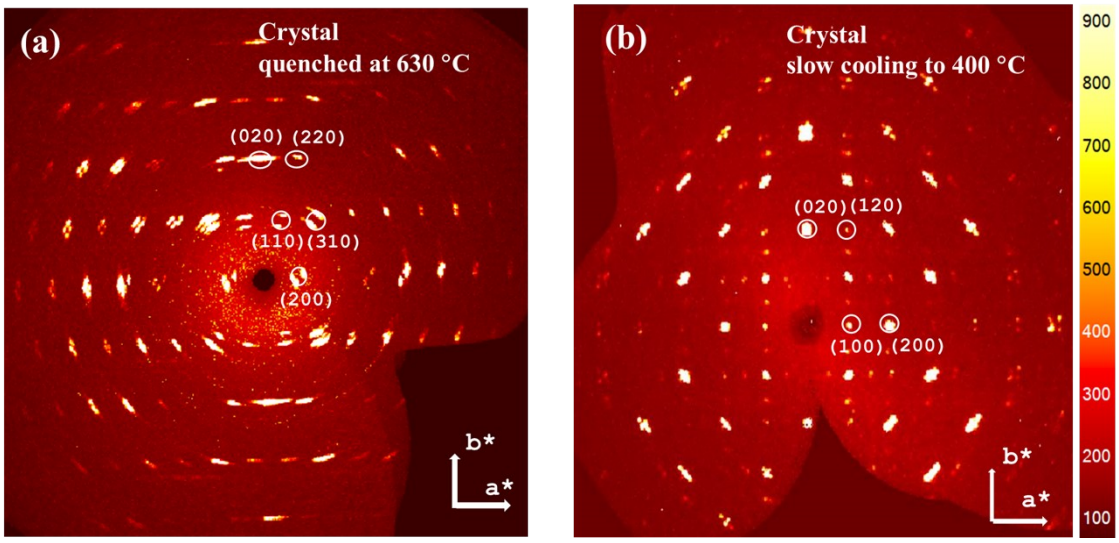
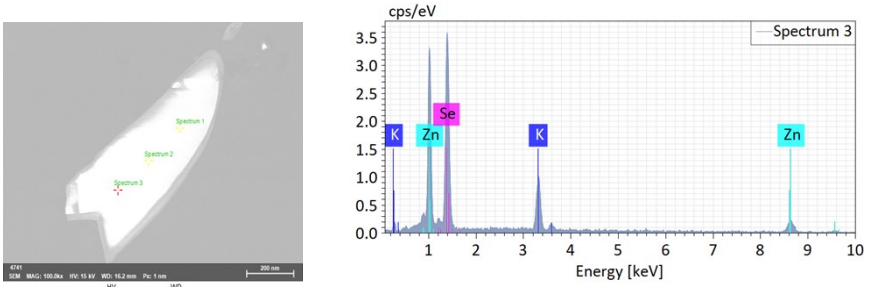


**Figure S2** SEM images and EDS spectrum of single crystals for (a) $K_2Zn_3Se_4$ (**1**) and (b) $K_2Mg_{0.5}Zn_{2.5}Se_4$ (**2**).

(a)




(b)

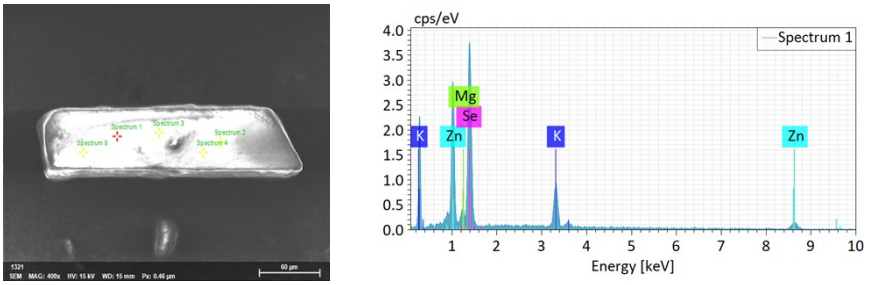
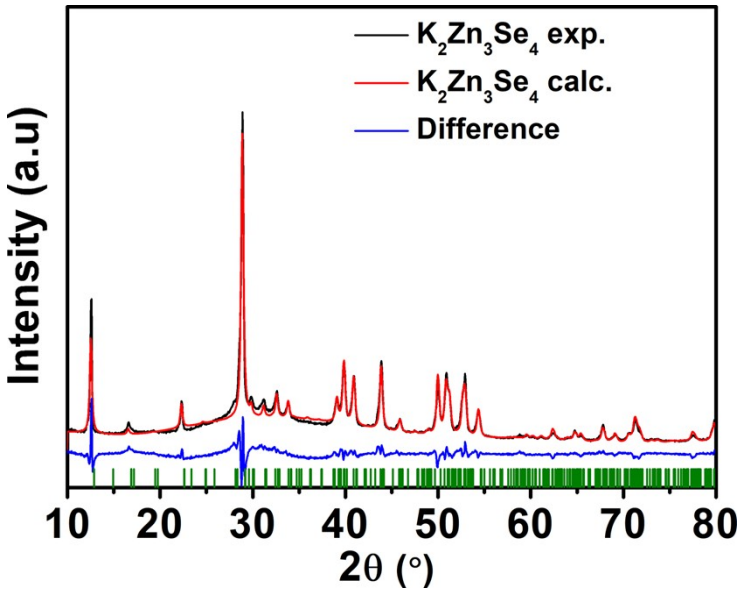


**Figure S3** Observed (black) and calculated (red) powder X-ray diffraction (PXRD) profiles along with the difference plots [Iobs-Icalc] (blue) of the Rietveld refinements for (a) $K_2Zn_{3(5)}Se_4$ (**1**) with converged *Rwp* = 9.59% and GOF = 4.96, and (b) $K_2Mg_{0.5}Zn_{2.5}Se_4$ (**2**) with converged *Rwp* = 9.98% and GOF = 3.84.

(a)




(b)

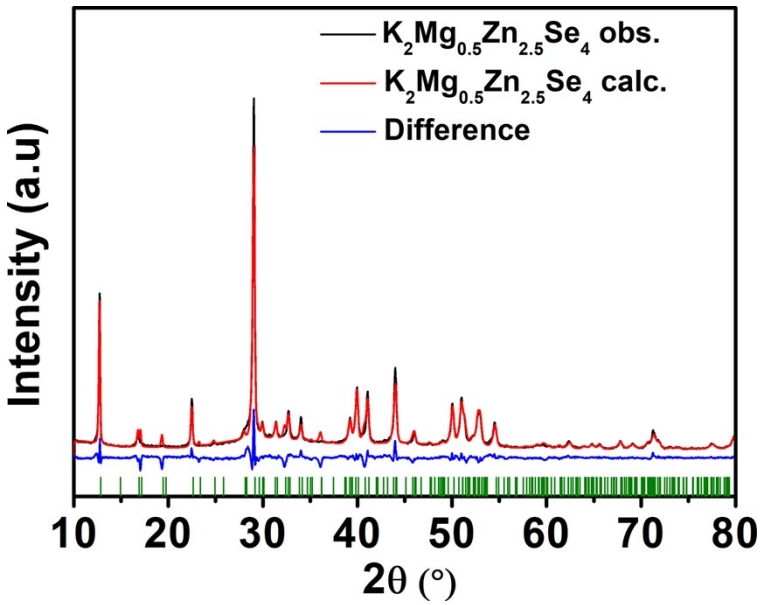
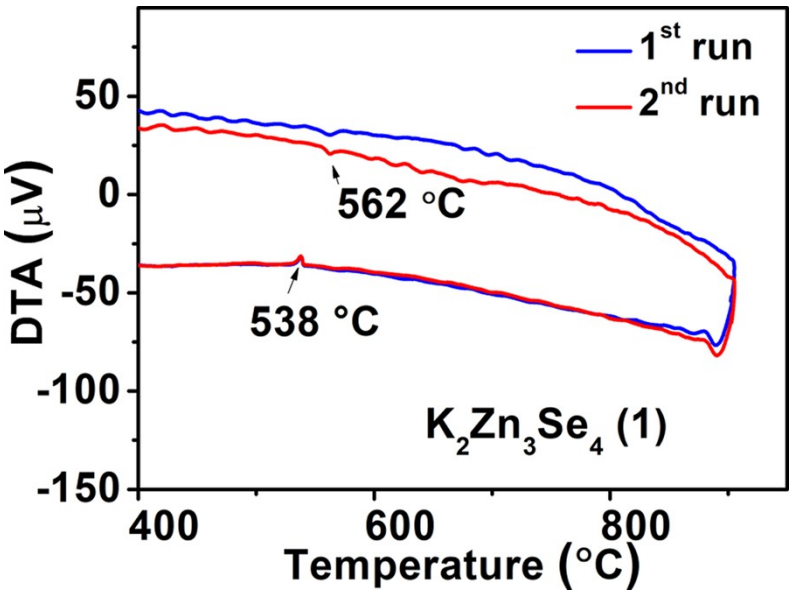


**Figure S4** Differential thermal analysis of the powder samples in two cyclic runs for (a) **1** and (b) **2**.

(a)




(b)

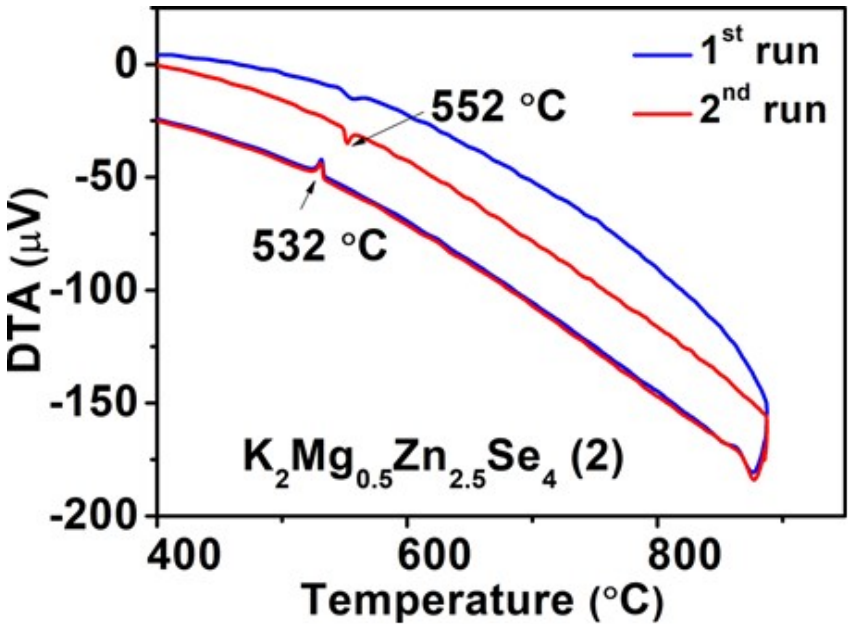
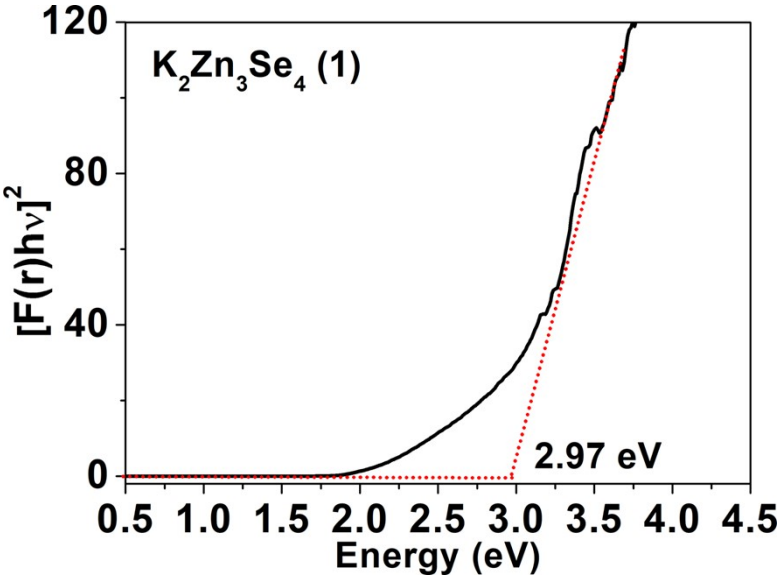


**Figure S5** The UV-vis-NIR reflectance spectrum of (a) **1** and (b) **2**.

(a)




(b)