Supplementary Material for

**Reversible transformation between α-oxo acids and α-amino acids on ZnS particles: A photochemical model for tuning the prebiotic redox homeostasis**

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**Temperature dependence**

The temperature dependence of the amination and deamination reactions is shown in Fig. S1. In the studied range, the efficiency of α-KG amination almost remained constant; while for the deamination reaction, the production rate of α-KG increased slightly linearly with the temperature. However, if taking into consideration the reproducibility of separate experiments (see the data at 30 ℃), it is hard to tell whether the slight fluctuation of the product yield is dependent of temperature.



**Fig. S1** Temperature dependence of glutamate and α-KG production in the reductive amination and oxidative deamination reactions, respectively. Conditions are the same as in Tables 1 and 2. Lines are drawn to aid the eye but not to fit the plotted points. Error bars are shown for the data at 30 ℃