

Supporting information

# Combinatorial synthesis of oxysulfides in the lanthanum-bismuth-copper system

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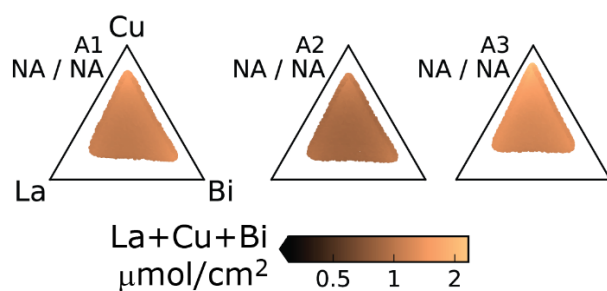


Fig. S1: The as-deposited libraries correspond to states A2, A2 and A3 demonstrating similar compositional coverage and metals loading.

Table S1: ICDD, crystal structure and space group data for 8 phases identified in Figures 3-5 in the main text.

Formula Unit	ICDD number	Crystal Structure	Space Group
LaCuSO	04-016-2625	tetragonal	P4/nmm
BiCuSO	04-016-2622	tetragonal	P4/nmm
CuS	00-006-0464	hexagonal	P6 <sub>3</sub> /mmc
Cu <sub>3</sub> BiS <sub>3</sub>	04-006-8325	orthorhombic	P2 <sub>1</sub> 2 <sub>1</sub> 2 <sub>1</sub>
Cu <sub>4</sub> Bi <sub>4</sub> S <sub>9</sub>	04-009-6532	orthorhombic	Pbnm
tetr-Bi <sub>2</sub> O <sub>3</sub>	00-027-0050	tetragonal	P-42 <sub>1</sub> c
hex-Bi <sub>2</sub> O <sub>3</sub>	01-080-5679	hexagonal	P31c
Bi <sub>6</sub> S <sub>5</sub> O <sub>8</sub>	04-020-1749	tetragonal	I4/mmm

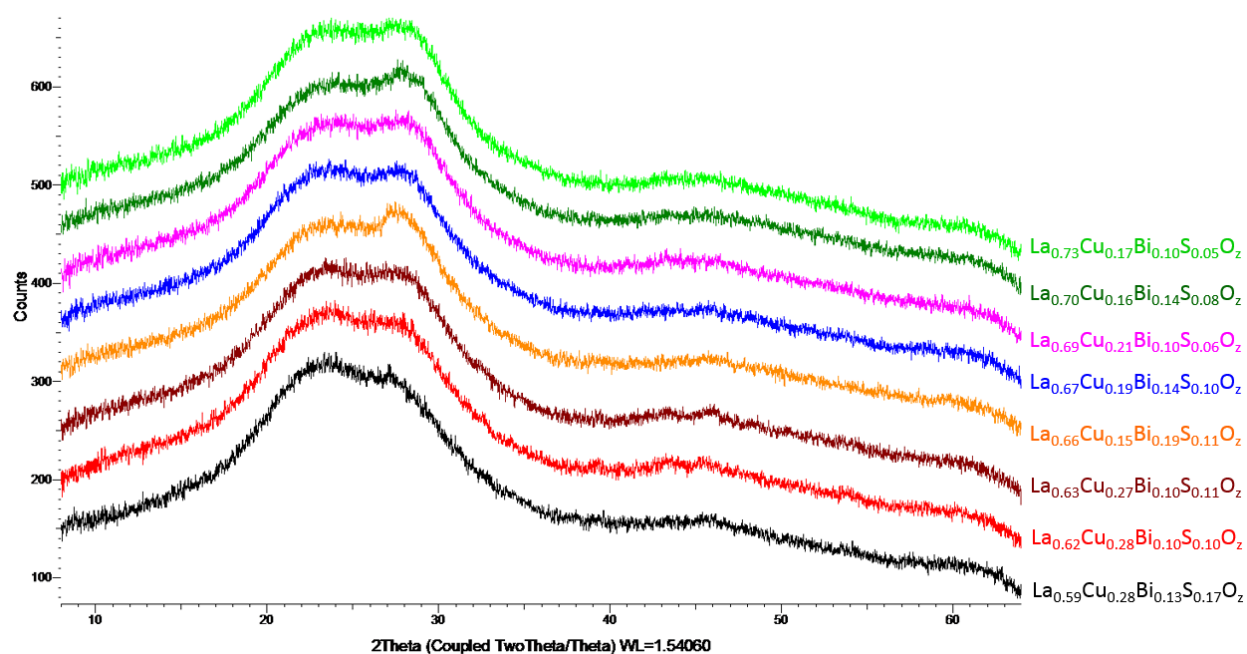


Fig. S2: Series of XRD patterns of the La-rich compositions from state K1 revealing that after the series of RTP up to 495 °C there is no discernable crystallization.

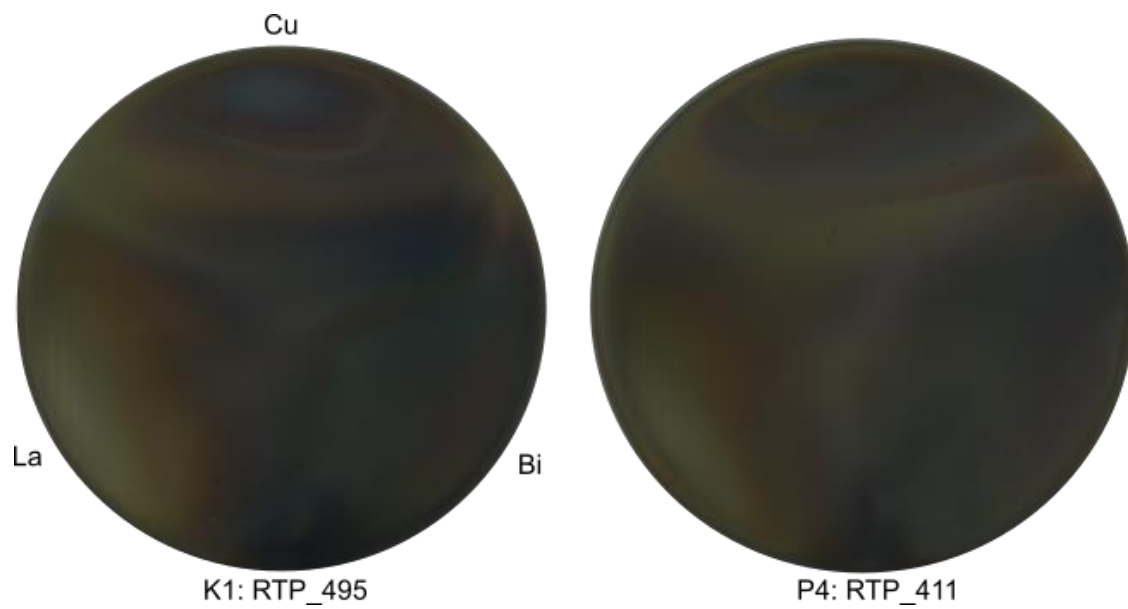


Fig. S3: Photographs of libraries in states K1 and P4, which in comparison to the series of photographs in Fig. 1 reveal the changes in optical properties due to RTP at 495 and 411 °C, respectively.