



Phase equilibria in the SrO - Sc₂O₃ - CuO system with emphasis on the Sr₁₄Cu₂₄O_{41-δ} phase (poster)

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PHASE EQUILIBRIA IN THE $\text{SrO} - \text{Sc}_2\text{O}_3 - \text{CuO}$ SYSTEM WITH EMPHASIS ON
THE $\text{Sr}_{14}\text{Cu}_{24}\text{O}_{41-\delta}$ PHASE

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The sub-solidus phase relations in the $\text{Sc}_2\text{O}_3 - \text{SrO} - \text{CuO}$ system were determined at 900°C in air (see Fig. 1). Like in the case of $\text{SRE}_2\text{O}_3 - \text{SrO} - \text{CuO}$ systems with SRE = small rare-earth elements, no ternary compound was formed. However, the $\text{Sc}_2\text{O}_3 - \text{SrO} - \text{CuO}$ system is dominated by the Sc_2SrO_4 phase, which is in equilibrium with all other phases. This is not the case in $\text{SRE}_2\text{O}_3 - \text{SrO} - \text{CuO}$ systems, where the $\text{SRE}_2\text{Cu}_2\text{O}_5$ phase is in equilibrium with $\text{Sr}_{14}\text{Cu}_{24}\text{O}_{41-\delta}$.¹ We confirm that the $\text{Sr}_{14}\text{Cu}_{24}\text{O}_{41-\delta}$ phase is slightly Cu-deficient², its formulation being closer to $\text{Sr}_{14}\text{Cu}_{23.5}\text{O}_{41-\delta}$.

While all rare-earth elements substitute on the Sr sites in the $\text{Sr}_{14}\text{Cu}_{24}\text{O}_{41}$ phase, Sc appears to partially replace Cu instead. This difference can be understood on the basis of ion size considerations. The solubility limit of Sc is low and amounts to about 2 at%. This substitution results in a shrinkage of the c-axis (running along the chains and ladders of the structure) by 0.3%.

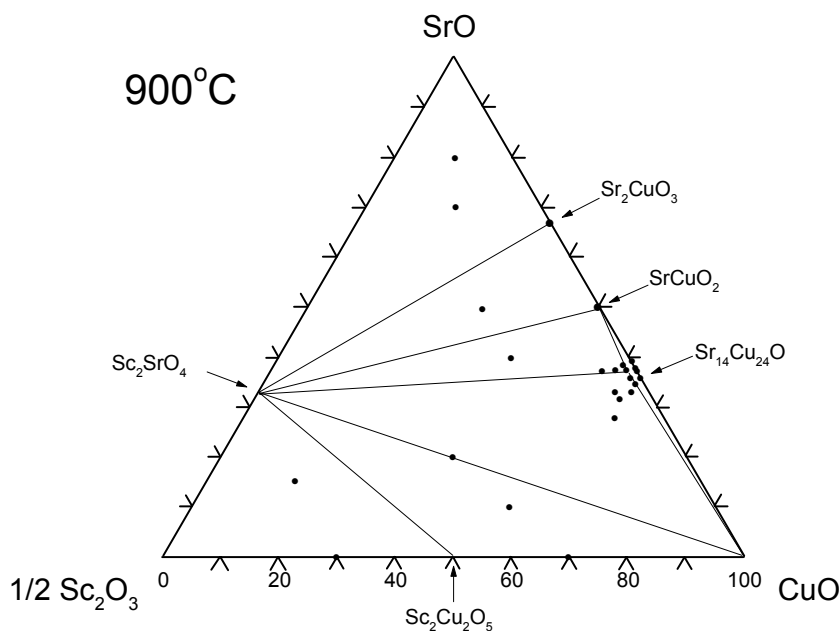


Fig. 1. Phase equilibria in the $\text{Sc}_2\text{O}_3 - \text{SrO} - \text{CuO}$ system at 900°C in air

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