

## **ASSESSMENT OF THE QUASI-TERNARY $\text{CuO}_{1/2}\text{-CaO-NaO}_{1/2}$ SYSTEM EQUILIBRATED WITH COPPER**

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In the copper industry, basic fluxes are commonly used to reduce the concentration of minor elements like As and Sb.  $\text{Na}_2\text{CO}_3\text{-CaO}$  has shown good theoretical and laboratory test efficiency for As and Sb removal. It is important to understand the interactions between copper oxide and  $\text{Na}_2\text{O}$  and  $\text{CaO}$  in order to predict chemical activities for these components in multi-component slags. Liquidus measurements were performed in the sub-systems  $\text{CuO}_{1/2}\text{-CaO}$  and  $\text{CuO}_{1/2}\text{-NaO}_{1/2}$  as well as in the quasi-ternary system  $\text{CuO}_{1/2}\text{-CaO-NaO}_{1/2}$ . Measurements were carried out in equilibrium with copper metal to fix the oxygen partial pressure and to avoid high concentrations of  $\text{Cu}^{++}$ . Differential thermal analysis (DTA) and time temperature transition curves (TTT) were used to identify the liquidus and solidus. Solubilities in the solid phases were studied with energy dispersive spectroscopy (EDS) and wavelength dispersive X-ray spectroscopy (WDX). All experimental data along with data from the literature were simultaneously optimized to obtain the best parameters of the quasi-chemical model for the liquid solution. The  $\text{CuO}_{1/2}\text{-CaO-NaO}_{1/2}$  phase diagram was calculated thermodynamically from the optimized parameters of all the phases.