

Characterisation of Incommensurate $\text{Bi}_{2+x}\text{Sr}_{2-x}\text{CuO}_2$
by X-ray Powder Diffraction and Oxygen
Content Determinations

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The composition-temperature stability region of the solid solution $\text{Bi}_{2+x}\text{Sr}_{2-x}\text{CuO}_2$, phase R, has been determined. At 800°C , $0.15 < x < 0.40$, and at melting temperatures $0.10 < x < 0.40$. The x-ray powder diffraction pattern can be indexed using a pseudo-tetragonal subcell, $a=b=5.390(1)$, $c=24.59$ Å, with a supercell vector q^* given by $q^*=n\delta b^*-n\epsilon c^*$, where $\delta=0.21$, $\epsilon=0.55$, for $x=0.30$ and $n=1,2,\dots$ both a and ϵ increased with x , c decreased with x and δ was independent of x . The excess oxygen content, α , was determined to be (0.18 ± 0.02) by citrate iodometry and was independent of x . The total oxygen content z , given by $z=5+x/2+\alpha$, was confirmed to be 6.33 ± 0.04 , for $x=0.30$, by hydrogen reduction thermogravimetry.