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Morphological Superconductors: Fundamental discoveries in Superconducting Materials.

Current applied research for the first known fabrication of morphological high temperature superconductors of $\text{YBa}_2\text{Cu}_3\text{O}_x$ (YBCO) and applications — in the form of morphologies of rods, tubes, wafers and spirals presented.

A significant finding is that the novel morphological HTSC materials are superconducting without the need for further sintering or oxygenation, providing an avenue for the application of $\text{YBa}_2\text{Cu}_3\text{O}_x$ to substrates at room temperatures or direct use in the form of powder.

A discovery of morphological structures is presented using the following measurement instruments. Transmission electron microscope (TEM) and scanning electron microscope (SEM) images reveal the tubular morphology of the structures. Application of X-ray diffraction showed that the powder consisted of nanorods and nanotubes predominantly of the $\text{YBa}_2\text{Cu}_3\text{O}_x$ phase. A critical superconducting transition temperature T_c of 92 K in a critical magnetic field of 10 Oe, along with observing the Meissner effect.