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Study of Potassium content and its role in doped superconductor $YBa_{2-x}K_xCu_yO_{6+x}$ with Rietveld analysis of XRD patterns

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Abstract: In this article, we have employed GSAS software to do Reitveld profile refinement on XRD patterns from H-T_c superconductor powder $YBa2_{-x}K_xCu_3O_{7-y}$ ($0<x,y<1$) samples. Increasing the Potassium doping content of the sample, x, causes some changes in the XRD patterns such as creating new peaks and also deteriorating of goodness of the refinement, χ^2. On the other hand, substituting of K instead of Ba led to oxygen depletion and also lowering the Ba (K) plane position along the Z direction (||c). The structural phase ratio of tetragonal to orthorhombic increased and it means that the superconductivity exist even in samples with dominant tetragonal phase.

Key words: *Superconductivity, Structural phase transition, Reitveld refinement*