



TITLE:

Effects of Substitution of Sr, K or Na for Ba on the Structure and Properties of Gel-Derived YBaCuO Superconducting Oxide (Commemoration Issue Dedicated to Professor Sumio Sakka On the Occasion of His Retirement)

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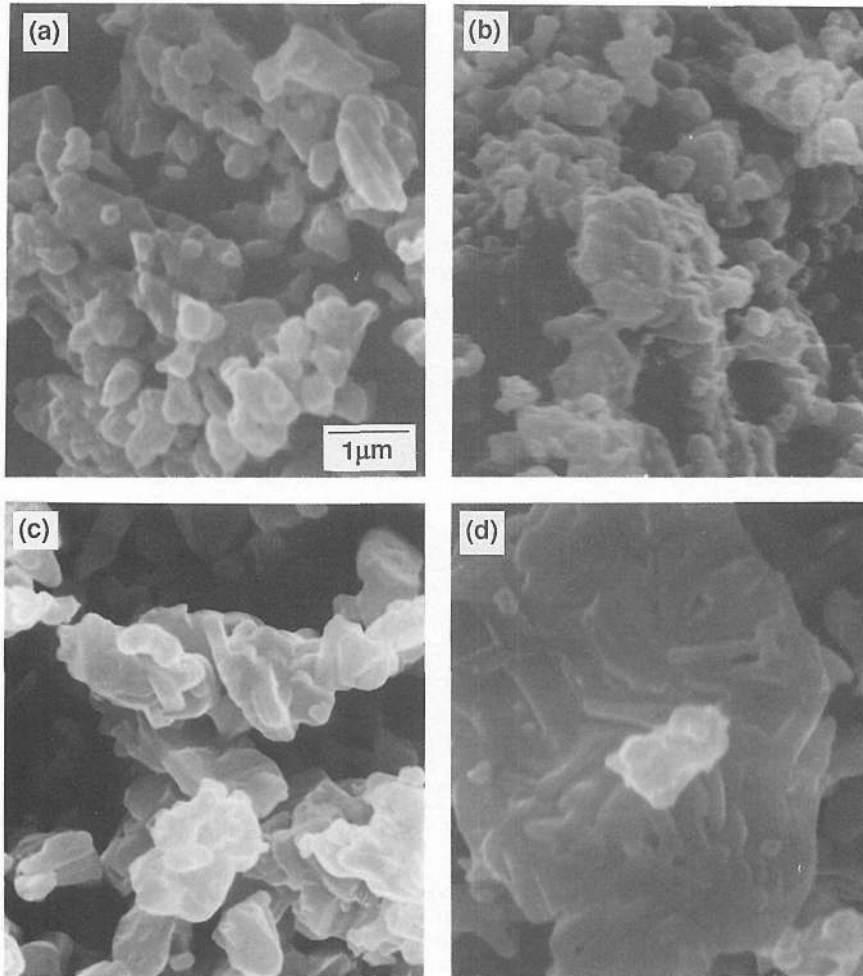


Fig. 7. The SEM photographs of the sintered pellets of  $\text{YBa}_{2-x}\text{R}_x\text{Cu}_4\text{O}_8$ ; (a) non-substituted 124 phase, (b)  $\text{R}=\text{Sr}$ ,  $x=0.4$ , (c)  $\text{R}=\text{Na}$ ,  $x=0.1$  and (d)  $\text{R}=\text{K}$ ,  $x=0.2$ .

### 3.5 SEM Observation

SEM photographs of sintered pellets of non-substituted 124 phase, Sr-124 phase of  $x=0.4$ , K-124 phase of  $x=0.2$  and Na-124 phase of  $x=0.1$  are shown in Fig. 7. It is seen that grains of K-124 and Na-124 phases are larger than those of non-substituted 124 and Sr-124 phases. The grain sizes are approximately  $0.2\text{--}1.0\ \mu\text{m}$  for non-substituted 124 and Sr-124 phases, and  $1.0\ \mu\text{m}$  for K-124 and Na-124 phases. It appears that K-124 and Na-124 pellets, which consist of plate-like grains, are sintered better than non-substituted 124 and Sr-124 pellets, which consist of smaller spherical grains.

## 4. DISCUSSION

### 4.1 Changes of Lattice Constants

There are three factors which determine the lattice constants of the present 124 phases; (1)





