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Study on inter-grain couplings of $Y_{1-x}Ca_xBa_2Cu_3O_{7-\delta}$ and $Y(Ba_{1-y}Sr_y)_2Cu_3O_{7-\delta}$ polycrystalline systems

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This study was aimed at investigating the nature of inter-grain couplings of $Y_{1-x}Ca_xBa_2Cu_3O_{7-\delta}$ and $Y(Ba_{1-y}Sr_y)_2Cu_3O_{7-\delta}$ polycrystalline samples with nominal compositions of $x = 0.00 - 0.20$, and $y = 0.00 - 0.10$. The samples were synthesized through conventional solid state reaction route. The phase formation was determined through *X-ray* powder diffraction, using *Rigaku X-ray* diffractometer (Cu- K_α). The *ac* susceptibility ($\chi-T$), and resistivity measurements under magnetic field ($\rho_{nor}TH$) were done by Physical Properties Measurement System (*Quantum Design-USA* PPMS-14Tesla).

The $\chi-T$ measurements obtained at different *ac* field amplitudes revealed that inter-grain couplings enhance with doping of Ca and Sr at Y and Ba sites respectively of $YBa_2Cu_3O_{7-\delta}$ (YBCO) polycrystalline samples. This was further proved by resistivity data and their first order derivative of temperature.

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