E1-46: AC magnetic susceptibility measurements on $Bi_{1.6}Pb_{0.4}Sr_2Ca_2Cu_3O_y$

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In this work, AC magnetic susceptibility measurements $\chi(T)$ on $Bi_{1.6}Pb_{0.4}Sr_2Ca_2Cu_3O_y$ superconducting sample were carried out in both zero and DC magnetic fields in the temperature range from 4.2K to 130K. AC Hartshorn bridge was used to measure AC susceptibility of the sample. Gold-iron/ chromel thermocouple was used to measure the temperature of the sample.

From $\chi(T)$ data in zero magnetic field, the onset superconducting transition temperature of the sample was found to be 107.5K. A single drop in the data suggests that the sample has only one superconducting phase. However, a small kink is observed in the $\chi(T)$ data at a temperature of 105.6K due to the weak-link couplings between the superconducting grains. When the magnetic fields were applied to the sample the superconducting transitions of the sample became broad as the magnetic fields suppressed superconductivity. $\chi(T)$data in low magnetic fields show 2 drops which are attributed to the intergrain and intragrain regions of the sample. In high magnetic field $\chi(T)$data shows only one drop suggesting that the magnetic field simultaneously penetrates into the superconducting grains and the weak-links.

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