ANNEALING EFFECTS ON FLUCTUATION-INDUCED CONDUCTIVITY OF $(Cu_{0.5}Tl_{0.25}Hg_{0.25})Ba_2Ca_3Cu_4O_{12-\delta}$ SUPERCONDUCTOR

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S u m m a r y

In the light of the Aslamazov–Larkin theory of fluctuation-induced conductivity (FIC), the excess conductivities of as-prepared, nitrogen-post-annealed, oxygen-post-annealed, and air-post-annealed samples of $(Cu_{0.5}Tl_{0.25}Hg_{0.25})Ba_2Ca_3Cu_4O_{12-\delta}$ have been determined. It is observed from FIC measurements that the crossover of a three-dimensional (3D) to a two-dimensional (2D) behavior of fluctuations is shifted to higher temperatures by the post-annealing of samples in nitrogen, oxygen, and air. We have accredited this behavior to an increase in the grain size and the improved carrier concentration in the conducting CuO_2 planes. In addition, it is also noted that, after the post-annealing of samples in nitrogen, oxygen, and air, the width of the three-dimensional region of fluctuations is also enlarged. Furthermore, two distinct parameters (coherence length and interplanar coupling) are also estimated by the Lawrence–Doniach equations and found to be increased by the post annealing in nitrogen, oxygen, and air.

Erratum: According to the author's letter the article contains the data which was mistakenly added to the article. Therefore the authors ask to withdraw the article.