



Contribution ID: 14

Type: **Poster presentation (105min)**

The dehybridization phenomenon in ternary cuprates and high- T_c superconductors

X-ray and photoemission studies of some ternary compounds of the R-Cu-Si system (R-rare-earth metal) and high-temperature superconductor (HTS) $\text{YBa}_2\text{Cu}_3\text{O}_{6.9}$ had been performed. Such objects selection is caused the fact that all named compounds are cuprates, in which the dehybridization phenomenon had been found. Characteristically, that all listed above ternary compounds are isostructural homologues and belong to the TrCr_2Si_2 structural type. However, research of electronic structure RCuSi (R-Ce, Yb) compounds which belongs to the structural type Fe_2P , and also RCu_4Al_8 (structural type ThMn_{12}) had been showed, that and in these compounds' families the dehybridization phenomenon had been observed also.

Thus, the display of dehybridization features in compounds of different structural types is showed, that the mentioned phenomenon carries universal character. Consequently, it is possible to assume that in HTS the exceptional role in the origin of superconductivity plays atoms of copper just due to dehybridization influence on the structure of the electronic states.

In connection with the expressed circumstances it is necessary to be stopped for finding out of dehybridization origin. Essence of the phenomenon is conditioned, first of all, by the $\text{Cu}3d$ -shell electronic structure features. This shell is power stable due to electronic configuration $3d^{10}$ and compact, able to divide the electronic states of compound's atoms-components and to activate its to Fermi level. As a result the density of the electronic states at Fermi energies $g(E)$ grows substantially.

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Track Classification: M-06: HTS Bulk