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Correlation between local crystal structure and physical properties in BiS2-based superconductors[1] YOSHIKAZU MIZUGUCHI, JOE KAJITANI, TAKAFUMI HIROI, OSUKE MIURA, Tokyo Metropolitan University, NAURANG SAINI, Sapienza University of Rome — Recently, layered superconductors with BiS2 conduction layer have been discovered. Since the layered structure and low-dimensional electronic states are similar to cuprates and Fe-based superconductors, studies on exploration of new superconductors and discussion of superconductivity mechanisms of the BiS2-based superconductors have got attention of researchers in the field of condensed matter physics. To understand the mechanisms of inducement of superconductivity in the BiS layer, we have investigated the physical properties and established superconductivity phase diagrams of various series of REO1-xFxBiS2. To understand those phase diagrams, powder x-ray diffraction and x-ray absorption fine structure were carried out. It was found that optimization local crystal structure and reduction of in-plane disorder should be correlating with the physical properties of BiS2-based compounds. We will discuss how superconductivity is induced and the Tc is enhanced, on the basis of local crystal structure such as atomic coordinates, atomic distances and in-plane disorder.

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