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**Superconducting properties of tetragonal FeSe and FeTe**  
YOSHIKAZU MIZUGUCHI, YOSHIHIKO TAKANO, NIMS — The discovery of LaFeAsO<sub>1-x</sub>F<sub>x</sub> superconductor triggered active studies on iron-based superconductors. Recently, superconductivity in tetragonal FeSe was reported. FeSe is the simplest-structured iron-based superconductor. We reported a huge enhancement of the transition temperature  $T_c$  under high pressure. The onset of  $T_c$  increased from 13 to 27 K at 1.48 GPa. FeSe undergoes a structural phase transition to orthorhombic around 70 K. A suppression of the structural phase transition will be a key to raise  $T_c$  in this system. Tetragonal FeTe has a structure very analogous to that of superconducting FeSe, however, does not show superconductivity, and undergoes a structural phase transition around 80 K. We synthesized S-substituted FeTe, FeTe<sub>1-x</sub>S<sub>x</sub>, and observed the suppression of the structural phase transition and superconductivity at low temperatures. Since FeTe<sub>1-x</sub>S<sub>x</sub> is composed of non-toxic elements, this compound is advantageous for applications. Here we report the pressure and the elementary substitution effects on FeSe, the pressure studies on FeTe, and the superconducting properties of FeTe<sub>1-x</sub>S<sub>x</sub>.

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