

## **Fe<sub>1+y</sub>Se<sub>x</sub>Te<sub>1-x</sub> superconductors: phase diagram, crystal growth, structural and magnetic properties**

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I will present a comparative study of the crystal structure and the magnetic properties of Fe<sub>1+y</sub>Se<sub>x</sub>Te<sub>1-x</sub>. In the first part of my talk I will present our investigation of a chemical binary Fe-Se phase diagram. Polycrystalline FeSe<sub>1-x</sub> ( $x = 0.0 - 0.15$ ) superconducting samples were synthesized by two different routes and studied by neutron powder diffraction and magnetization measurements. The effect of a starting (nominal) stoichiometry on the phase purity of the obtained samples, the superconducting transition temperature  $T_c$ , as well as the chemical stability of FeSe<sub>1-x</sub> at ambient conditions was investigated. We have found that in the Fe-Se system a stable phase exhibiting superconductivity at  $T_c \sim 8\text{K}$  exists in a narrow range of selenium concentration (FeSe<sub>0.974±0.005</sub>). In the second part of my talk I will speak about ternary Fe-Se-Te system. I will present our recent results on Fe<sub>1+y</sub>Se<sub>x</sub>Te<sub>1-x</sub> single crystal growth and study of their structural and magnetic properties as a function of Fe content and Se/Te ratio.