Poster Presentation

MS98.P02

Phase separation in AyFe2-xSe2 (A= K, Rb, Cs) superconductors

E. Pomjakushina[1], A. Krzton-Maziopa[2], V. Pomjakushin[3], A. Bosak[4], D. Chernyshov[4], V. Svitlyk[4], V. Dmitriev[4], S. Speller[5], K. Conder[1]

[1]Laboratory for Development and Methods, Paul Scherrer Institut, Villigen, Switzerland, [2]Faculty of Chemistry, Warsaw University of Technology, Warsaw, Poland, [3]Laboratory for Neutron Scattering, Paul Scherrer Institut, Villigen, Switzerland, [4]Swiss–Norwegian Beam Lines at ESRF, Grenoble, France, [5]Department of Materials, University of Oxford, Oxford, UK

The interplay between superconductivity, magnetism and crystal structure in iron-based superconductors has attracted a great interest in the recent years as it is considered to be the key for understanding the mechanisms responsible for high temperature superconductivity. Alkali metal intercalated iron chalcogenide superconductors (A122) exhibit unique behavior which is not observed in other iron-based superconducting materials such as antiferromagnetic ordering above room temperature and iron vacancies ordering. These materials have complex crystal structures with several phase transitions and are mixtures of phases even in the form usually described as a single crystal. A pronounced reversible phase separation revealed in A122 single crystals, as well as controversies regarding the origin of superconductivity and the stoichiometry and symmetry of the superconducting phase are still in the forefront of scientific activity. Here we will present a diffraction study of the crystal structures, antiferromagnetic ordering and intrinsic phase separation in alkali-metal iron chalcogenides [1]. The complementary scanning electron microscope study, including high-resolution electron back-scatter diffraction mapping will be also presented [2].

[1] *V. Yu. Pomjakushin, A. Krzton-Maziopa, E. V. Pomjakushina, K. Conder, D. Chernyshov, V. Svitlyk and A. Bosak. J. Phys.: Condens. Matter 24 (2012) 435701,* ***[2]*** *S. C. Speller, T. B. Britton, G. M. Hughes, A. Krzton-Maziopa, E. Pomjakushina, K. Conder, A. T. Boothroyd and C.R. M. Grovenor. Supercond. Sci. Technol. 25 (2012) 084023*

Keywords: superconductor, diffraction, phase separation