High-pressure studies for hydrogen substituted $CaFeAsF_{1-x}H_x$

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High-pressure electrical resistivity measurements have been carried out for $CaFeAs_{1-x}H_x$, which has been successfully synthesized very recently[1]. Hydrogen atoms are incorporated as H^- ions at the F^- sites. In case of CaFeAsF superconductivity appears with Co substitution into Fe, which is considered to be an electron doping. In $CaFeAs_{1-x}H_x$, superconductivity does not appear with H substitution, because the isovalent substitution does not affect largely the electronic state. On the other hand, pressure-induced superconductivity appears at 28 K at 5 GPa[2] for CaFeAsF. In this study superconducting properties for H substituted materials were investigated from the high-pressure electrical resistivity measurements. For CaFeAsH the pressure-induced superconductivity was confirmed at 28 K at 3 GPa, which is a little smaller than the case of CaFeAsF. High-pressure x-ray diffraction is now in progress to decide the crystal structure under high pressure.

[1]T. Hanna et al., arXiv :1103.1177. [2] H. Okada et al., Phys.Rev. B81, (2010) 054507.