

Abstract Submitted
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Discovery and physical properties of new iron-based superconductors (Ca,*RE*)FeAs₂ HIROYUKI YAKITA, HIRAKU OGINO, ALBERTO SALA, TOMOYUKI OKADA, AKIYASU YAMAMOTO, KOHJI KISHIO, TETSUYA TOHEI, YUICHI IKUHARA, JUN-ICHI SHIMOYAMA, The University of Tokyo, YOSHITO GOTOH, HIROSHI FUJIHISA, KUNIMITSU KATAOKA, HIROSHI EISAKI, National Institute of Advanced Industrial Science and Technology — Since 2008, iron-based superconductors with various blocking layers have been reported. However, discovery of new superconductors has been still expected. Here, we report a new superconductor (Ca,*RE*)FeAs₂ [(Ca,*RE*)112]. Plate-like single crystals of the new compound were successfully grown, and single crystal X-ray diffraction analysis revealed the monoclinic crystal structure of the new phase. The structure is composed of two Ca(Pr) planes, anti-fluorite type Fe₂As₂ layer, and As₂ zigzag chain layer. HAADF-STEM images of the sample correspond well to the structure determined by the XRD analysis. Large diamagnetism suggesting 20 K-class bulk superconductivity was observed in magnetization measurement, and superconducting transition accompanying zero resistance was also confirmed in resistivity measurement. We have also succeeded in the syntheses of (Ca,*RE*)112 phase with *RE* = La, Ce, Nd, and Sm. (Ca,La)112 phase showed higher *T_c* than (Ca,Pr)112 phase.

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