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Superconductivity and Magnetism in isovalent substituted Europium Iron-Asenide Superconductor $EuFe_2As_{2-x}P_x$ TAKUYA ISHIKAWA, YOHEI JONO, KASUMI TASHIMA, KAZUO KADOWAKI, TAKANARI KASHIWAGI, University of Tsukuba — The EuFe2As2-xPx system is known as a coexisting system of superconductivity and magnetism with varying isovalent substitution concentration of P in place of As. Magnetism seems to originate from localized Eu^{2+} moments around 19 K, whereas Superconductivity occurs at 28 K in x = 0.4. We have studied magnetic and transport properties in various single crystals grown by the self-flux method in a vertical Bridgman furnace, whose compositions are characterized by EPMA and ICP-AES. From temperature dependence of magnetic susceptibility Eu has a magnetic moment of $7.9\mu_B$ indicating Eu^{2+} obtained previously, and did not depend on x upto x = 0.3, then coexists with superconductivity above x = 0.4. At the coexisting region we showed a reentrant behavior of the superconductivity in resistivity and it shows a peculiar magnetic field dependence.We show the precise phase diagram and superconductivity as a function of x.

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