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Impurity substitution effect on Dirac cone in $Ba(FeAs)_2$ studied by magnetoresistance TAKAHIRO URATA, YOICHI TANABE, KHUONG HUYNH, SATOSHI HEGURI, Department of physics, Graduate school of science, Tohoku University, Aoba, Aramaki, Aoba-ku, Sendai, 980-8578, Japan, HIDETOSHI OGURO, KAZUO WATANABE, High Field Laboratory for Superconducting Materials, Institute for Materials Research, Tohoku University, Sendai 980-8577, Japan, KATSUMI TANIGAKI, WPI-Advanced Institutes of Materials Research, Tohoku University, Aoba, Aramaki, Aoba-ku, Sendai 980-8578, Japan — In iron pnictide superconductors, the three dimensional Dirac cones (DCs) are created as a node of spin-density-wave gap [1]. Due to the pseudospin chirality, these DCs are robust for both nonmagnetic and magnetic impurities. Here we report Ru and Mn substitution effects on DCs in $Ba(FeAs)_2$ studied by magnetoresistance [2]. We assume that Ru is the nonmagnetic impurity while Mn is the magnetic one due to the stability of the $Mn^{2+}(3d^5)$ state. A linear magnetoresistance (LMR) against magnetic field (B) was observed above the certain magnetic field strength of B* for both cases. LMR in $Ba(Fe_{1-x}Ru_xAs)_2$ is consistent with the quantum limit of DC [3,4]. Temperature (T) dependence of B* deviated from the theoretical model at low T for $Ba(Fe_{1-x}Mn_xAs)_2$. This can be understood in term of the decrease of Fermi velocity of DCs, being associated with the magnetic scattering effect on DCs. [1] Y. Ran et al., Phys. Rev. B 79, 014505 (2009).[2]Y. Tanabe et al., Phys. Rev. B 84, 100508(R) (2011). /Phys. Rev. B 86, 094510 (2012). [3]A. A. Abrikosov, Phys. Rev. B 58, 2788 (1998).[4]K. K. Huynh et al., Phys. Rev. Lett. 106, 217004 (2011).

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