

Abstract Submitted
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Doping dependence of $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ thin films by the THz conductivity measurement D. NAKAMURA, F. NABESHIMA, Y. IMAI, A. MAEDA, Dept. of Basic Science, the University of Tokyo, T. KATASE, Materials and Structures Laboratory, Tokyo Institute of Technology, H. HIRAMATSU, ERATO-SORST, Japan Science and Technology Agency, H. HOSONO, Materials and Structures Laboratory, Tokyo Institute of Technology — We investigated the THz conductivity for thin films of Fe-based superconductor, $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ with different Co concentrations. For the optimally doped sample, we found a structure corresponding to superconductivity gap, 2Δ , whose magnitude is 2.8 meV at low temperatures, leading to $2\Delta/k_B T_c = 4.1$ [1]. This value is in good agreement with the smaller gap found in an ARPES measurement[2]. For the underdoped sample in which the coexistence of antiferromagnetic ordering with superconductivity was observed, we found the strong suppression of the carrier lifetime around the antiferromagnetic phase transition temperature ($T \sim 40$ K). However, the real part of the complex conductivity did not be clearly suppressed in this temperature region. This behavior may be related to the response of carriers at the Dirac cone, which observed in BaFe_2As_2 [3]. Details will be discussed in the presentation.

- [1] D. Nakamura *et al.*, arXiv: 0912.4351.
- [2] K. Terashima *et al.*, PNAS 106 (2009) 7330.
- [3] P. Richard *et al.*, Phys. Rev. Lett. 104 (2010) 137001.

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