

 <b>MLF Experimental Report</b>	提出日 Date of Report
課題番号 Project No. 2105A0198 実験課題名 Title of experiment $\mu$ SR study of the Fe-substitution effects on the possible ferromagnetic state in the non-superconducting heavily overdoped high- $T_c$ cuprates 実験責任者名 Name of principal investigator Tadashi Adachi 所属 Affiliation Department of Engineering and Applied Sciences, Sophia University	装置責任者 Name of responsible person Yasuhiro Miyake 装置名 Name of Instrument/(BL No.) D1 実施日 Date of Experiment 2016. 5. 20 – 21

試料、実験方法、利用の結果得られた主なデータ、考察、結論等を、記述して下さい。(適宜、図表添付のこと)  
 Please report your samples, experimental method and results, discussion and conclusions. Please add figures and tables for better explanation.

1. 試料 Name of sample(s) and chemical formula, or compositions including physical form.  Bi-based high- $T_c$ cuprates $\text{Bi}_{1.76}\text{Pb}_{0.35}\text{Sr}_{1.89}\text{CuO}_{6+\delta}$ Single crystals
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2. 実験方法及び結果 (実験がうまくいかなかった場合、その理由を記述してください。) Experimental method and results. If you failed to conduct experiment as planned, please describe reasons.  Zero-field and longitudinal-field $\mu$ SR measurements have been performed using dilution refrigerator at temperatures between 51 mK and 10 K and in magnetic fields up to 150 G for non-superconducting heavily overdoped $\text{Bi}_{1.76}\text{Pb}_{0.35}\text{Sr}_{1.89}\text{CuO}_{6+\delta}$ single crystals. Measurements were performed in the double-pulsed mode.  In zero field, the overall behavior of the spectra does not change so much with the temperature. The spectra consists of fast depolarizing component below 4 $\mu$ sec and slowly depolarizing component above 4 $\mu$ sec. It is found that the behavior of the fast depolarizing component is temperature-independent while that of the slowly depolarizing component weakly depends on the temperature. From the analysis, the asymmetry of the fast depolarizing component is larger than that of the slowly depolarizing component. It is concluded that the fast depolarizing component originates from muons stopping not at the sample but at Cu or Al in the dilution refrigerator. The reason why more than half of muons did not stop at the sample is not clear yet.
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## 2. 実験方法及び結果(つづき) Experimental method and results (continued)

For the slowly depolarizing component, the depolarization rate slightly increases with decreasing temperature and exhibits the maximum around 500 mK, suggesting the development of the spin correlation. However, because of the small asymmetry of the slowly depolarizing component, the details have not yet been clear.