

 MLF Experimental Report	提出日 Date of Report 2010.5.26,
課題番号 Project No. 2009B0014 実験課題名 Title of experiment; Pre-martensitic phenomena of thermoelastic martensitic transformation in NiTi alloys studied by muon 実験責任者名 Name of principal investigator Mototsugu Mihara 所属 Affiliation Osaka 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 2010.1.31 - 2010.2.3

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.
NiTi alloy; Ni _{51.3} Ti _{48.7} , polycrystal, plate

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 (ZF) muon spin relaxation in NiTi alloy (Ni _{51.0} Ti _{49.0}) was measured at temperatures between 10 and 350 K. The shape of the relaxation curves was nearly exponential. The result shows that The muon spin relaxation rate starts to increase with decreasing temperature at around 270 K which is a little above the martensitic transformation (Ms) temperature as shown in Fig. 1. This might be concerned with the pre-martensitic phenomena prior to the Ms which has been suggested from the positron annihilation lifetime measurements [1]. The previous results at PSI for Ni _{51.3} Ti _{48.7} is also shown in Fig. 1. The Ni _{51.3} Ti _{48.7} sample is considered that the Ms temperature is a little bit lower than the present Ni _{51.0} Ti _{49.0} sample because of a little higher Ni concentration. However, the relaxation rates for these two samples seem to be nearly the same. The muon spin relaxation in this system might be from dipolar field from host nuclei, magnetic impurity or excess Ni ions, or other mechanisms, which has not been clarified yet, Samples with other composition ratio than these two samples showing higher Ms temperature will be tried in order to specify the cause of muon spin relaxation and to verify the pre-martensitic phenomena.

2. 実験方法及び結果(つづき) Experimental method and results (continued)

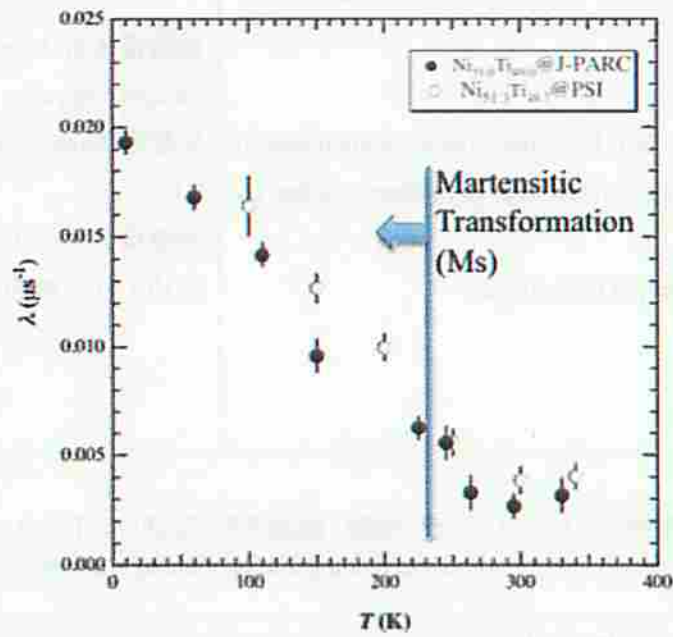


Fig. 1. Temperature dependence of the zero-field muon spin relaxation rate in NiTi alloys

[1] J. Katsuyama et al., Sci. Tech. Adv. Mat., 5 (2004) 41.