


実験報告書様式(一般利用課題・成果公開利用)

(※本報告書は英語で記述してください。ただし、産業利用課題として採択されている方は日本語で記述していただいても結構です。)

 <b>MLF Experimental Report</b>	提出日 Date of Report
課題番号 Project No. 2014A0076  実験課題名 Title of experiment: Energy selective tomography of a duplex stainless steel 2205 reference sample: phase mapping and microstructural characterization through the RITS code  実験責任者名 Name of principal investigator: Grazzi Francesco  所属 Affiliation Consiglio Nazionale delle Ricerche, Istituto dei Sistemi Complessi (Italy)	装置責任者 Name of responsible person Oikawa / Shinohara 装置名 Name of Instrument/(BL No.) BL10  実施日 Date of Experiment 2014/11/11 – 2014/11/17

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.
Duplex stainless steel cube (FeNi) Meteorite sample (FeNi)

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.
<p>The aim of the experiment was the characterization of the ferrite and austenite phase distribution into a two phase sample by exploiting the Bragg edge profile relative to each of the phases and estimating the relative concentration by its height.</p> <p>The samples were selected to be smaller than the beam size in order to fully irradiate them during all the measurements. The experiment was performed measuring the two samples using the microchannel plate detector developed by Anton Tremsin and available on BL10 in collaboration with him and with Dr. Shinohara. The detector was coupled with a rotating stage in order to combine acquisition with sample rotation. The measurements were performed by analyzing the Bragg edge time of flight profile of the whole samples searching for the 110 ferrite and 200 austenite edges.</p> <p>In order to perform tomography a minimum number of 48 projections were measured for both the samples thus adjusting the measuring time.</p>

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

The signal to noise ratio resulted very low with high spatial resolution so, for data analysis, it was necessary to apply binning thus reducing spatial resolution but increasing the signal to noise ratio quality. Anyway, it was not possible to perform RITS code analysis because of the difficult selection of the background. Only qualitative analysis of ferrite and austenite distribution was performed both in terms of intensity and in terms of microstructure and texture. Analysis was performed using the imageJ software.

The Bragg edge profile obtained for the duplex steel sample is shown in fig.1, evidencing the presence of both ferrite and austenite phases Bragg edges. It is important to underline the extremely good result of the identification of the two 110 ferrite and 111 austenite Bragg edges that, nevertheless their close position are clearly identified and distinguished.

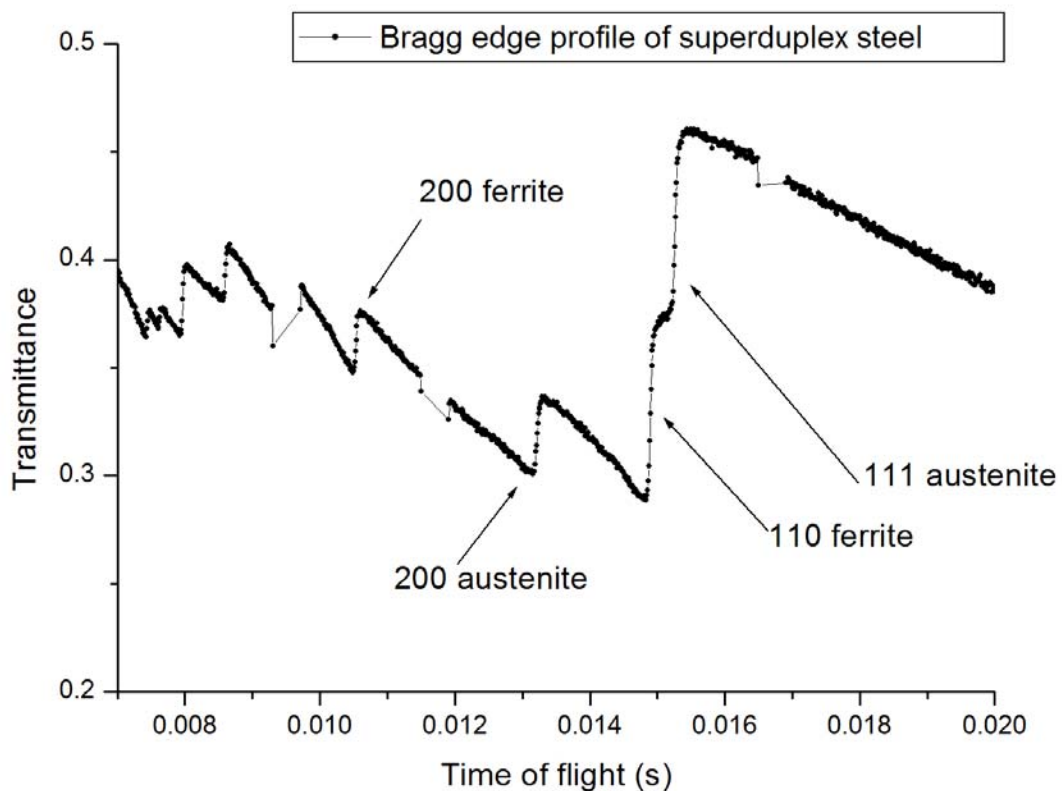


Fig.1 Superduplex steel Bragg edge profile evidencing the presence of both ferrite and austenite Bragg edge series.