![J-PARC] **MLF Experimental Report**	提出日 Date of Report
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課題番号 Project No. 2012B0036	装置責任者 Name of responsible person Hideo HARADA
実験課題名 Title of experiment	装置名 Name of Instrument/（BL No.）
Examination of the basic condition with the analysis of cosmetics by ANNRI	BL-04，ANNRI
実験責任者名 Name of principal investigator	実施日 Date of Experiment
Etsuko Furuta	13 Dec. 2012, 14 Feb. 2013
所属 Affiliation	
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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.

Au(Grade⇒24K；100% 、No.3；Au95.79%，Ag3.53%，Cu0.67% 、No.5(Quarter)；Au75.53%，Ag24.46% 、No.6(Half)；Au58.01%，Ag41.99%, For eats; unknown), Thickness; 0.1μm

Ag；100%　50mg, Thickness；0.1μm

Cosmetics claiming Au (Ag) addition; jell and powder [The powder was analyzed by INAA of JRR-3. The addition of gold and silver was confirmed.]

Chinese medicine (Base; Musk) pill for one time intake; 32mg

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.

First experiment　(13 Dec. 2012)

1. A sheet type Au (24K; square) was enclosed in twofold FEP film by measuring its weight. The sample was put in a FEP bag, then irradiated and measured 1 h.

  Result: By the preliminary analysis of the TOF spectrum, any peaks of Au were not shown. So, detail analysis is necessary.

2. A sheet type Au (Au58.01%, Ag41.99%; square) was enclosed in twofold FEP film by measuring its weight. The sample was put in a FEP bag, then irradiated and measured 30 min.

  Result: In the TOF spectrum, the peak positions of gold and silver were slight differences and two peaks were shown in parallel, but a little overlapped.

3. The background of the day was measured 1.5 h.

  Result: Many gamma ray peaks of Al and Mn were measured and it is considered that the background level was high for our analysis.

4. A gold sample for eats was also enclosed in a same way; the weight was the heaviest in the samples, so

irradiated and measured 1h.

4. **Result:** By the preliminary analysis of the TOF spectrum, any peaks of Au were not shown. So, detail analysis is necessary.

5. Cosmetic sample of powder was made in a same way of other samples and irradiated overnight.

   Result: The peak of Au was not show in the PGA spectrum. However, a Au peak was shown in the TOF spectrum by the preliminary analysis. Because cosmetics include many elements, it needs more detailed analysis for cosmetics.

Second experiment (14 Feb. 2013)

6&7. Each sheet (10 cm square) was folded approximately 5 mm square. Two kind of Au (24K; 37 mg, Half Au; 22 mg) were irradiated and measured 1 h, and Ag (49.5 mg) was irradiated and measured 30 min.

   Result: A Au peak was clearly shown in the TOF spectrum by the preliminary analysis. Because the thickness of the sample is big, the revision of self-absorption and dead time will be necessary for analysis.

8. The background of the day was measured 1.5 h. The result was same as the first experiment.

9. As a preliminary experiment, Chinese medicine (Base; Musk) 32.13 mg was enclosed in a same way of Au, and irradiated and measured 1.5 h.

   Result: By the preliminary analysis of the TOF spectrum, a large peak of As and a small peak of Hg were shown clearly**.** The Chinese medicine had enough sensitivity for analysis by ANNRI.

10. Cosmetic sample of jell was dried under an infrared lamp, enclosed in the same way and irradiated overnight.

   Result: The peak of Au was not show in the PGA spectrum. However, an Au peak was shown in the TOF spectrum by the preliminary analysis. Because cosmetics include many elements, it needs more detailed analysis for cosmetics.

  It is a merit of the ANNRI which can get 5 types of spectrum; MPGA, TOF, MPGA, TOF-PGA and TOF-MPGA. In this experiments, the peaks of Au and Ag (and As and Hg) were observed on the TOF spectrum preliminary. When the gamma-ray spectra are analyzed by using a gate in TOF with more rigid distinction performance gain, it is considered that the results can get better S/N ratio. So, the gamma-rays need more detail analysis by MPGA, TOF-PGA and so on. At the same time, it is difficult now for normal users to analyze the multiple data.

  The main elements of BG will be activated aluminum and manganese which construct the beam line. So, it is necessary to improve the beam line, because the decrease of the BG level is necessary for our purposes.

  In other words, it is considered that the improvement of the beam line and the progress of analysis technique for users are necessary to get superior results.