

Characteristics of the Super Micro Focus X-ray Tube

1. Overview

Application Brief No.7 introduced the possibility of measuring a sample 40 μm wide while realizing an actual beam width of 30 μm by using the super micro focus X-ray tube and 15 μm wide collimator. This application brief presents an example of a Au/Ni/Cu measurement and compares physical characteristics, in particular, attributes using molybdenum as the X-ray tube target material with those of the conventional micro focus tube (tungsten).

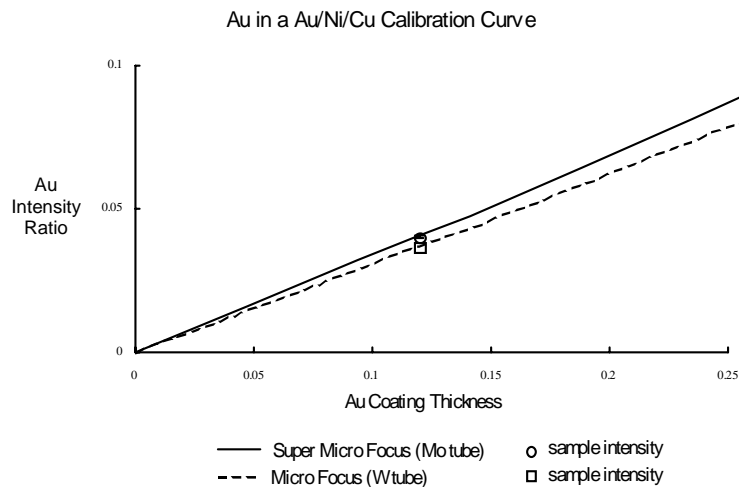
2. Measurement Conditions

Conditions of analysis are listed in the following table.

	Micro Focus	Super Micro Focus
Model	SFT3200S	SFT3200S
Collimator	0.1 mm	0.1 mm
Target	W	Mo
Tube Voltage	45 kV	45 kV
Tube Current	1 mA	1 mA

3. Calibration Curve

An Au calibration curve is displayed below.



These results show that the super micro focus tube has higher sensitivity in a Au measurement and the micro focus tube has higher sensitivity in a Ni measurement.

4. Measurement Results

Results of thirty 10-second measurements of standard samples are displayed below.

Micro Focus Tube

Au Sample	Ave	Range	SD	CV (%)
0.045 um	0.051	0.029	0.007	14.46
0.12 um	0.113	0.028	0.008	7.022
0.26 um	0.268	0.039	0.011	4.01

Super Micro Focus Tube

Au Sample	Ave	Range	SD	CV (%)
0.045 um	0.047	0.02	0.005	9.683
0.12 um	0.107	0.02	0.005	4.787
0.26 um	0.25	0.033	0.008	3.395

5. Summary

The results herein show that by using the super micro focus tube, dispersion can be held to about 30% at thickness level near 0.1 um in an Au measurement. This result is effective for other films such as palladium and lead.