

## Au/Pd/Ni/Cu Lead Frame Measurement

### 1. Overview

This application brief reports on three layer simultaneous measurement of palladium and nickel thin films that contain ultra-thin gold film (20 to 100 angstroms).

### 2. Analysis Conditions

Analysis conditions are listed in Table 1.

Table 1

Item	Settings
Model	SEA5120
Collimator	1.8 mm
Tube Voltage	15 kV
Tube Current	Auto Set
Target material	Mo
Atmosphere	Vacuum
Measurement Time	100 seconds

### 3. Analysis Results

#### 3-1 Sample Spectrum

The sample spectra displayed in Figures 1 and 2 clearly show the existence of an Au peak for Au thickness of approximately 30 angstrom.

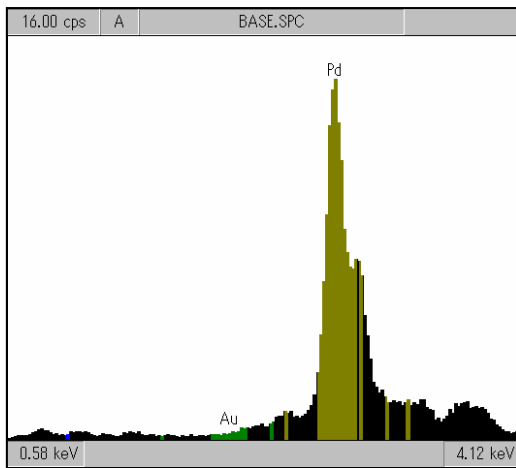


Figure 1 Without Au Layer

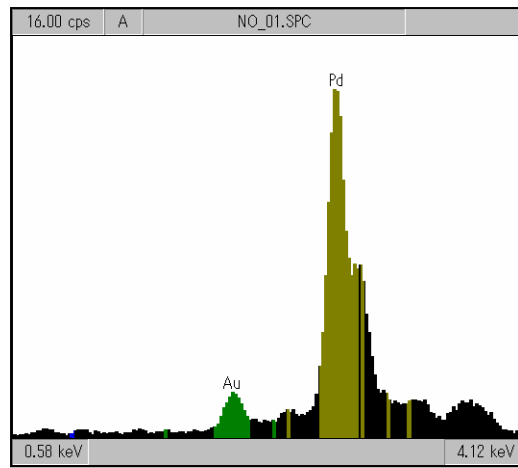


Figure 2 Au Layer (30 angstroms)

### 3-2 Quantitative Method

Quantitative calculations were performed using the Fundamental Parameter method.

### 3-3 Analysis Results

Quantitative analysis results are shown in Table 2. Results are average values of 10 measurement repetitions on the same sample.

**Table 2 Results of Analysis**

	Sample 1			Sample 2			Sample 3		
	AVE	CV	Range	AVE	CV	Range	AVE	CV	Range
Au layer	0	---	---	26	5.63	4	210	1.79	11
Pd layer	1367	1.59	77	1481	1.36	56	1740	1.46	93
Ni layer	8258	0.82	255	8743	0.65	156	8946	0.65	181

## 4. Comments

An Au thin film at a thickness of 20 to 100 angstroms can be measured with a dispersion of 5% or less. Using the Fundamental Parameter Method, up to five layers, with a maximum of 10 elements in each layer, can be measured along with composition ratios. (This does not apply when identical elements exist in different layers.)