

## Examination of Metal Allergies in Dentistry

### 1. Overview

Recently there has been heighten anxiety concerning the safety of biomaterials and reports of allergy illnesses thought to be caused by these materials have been on the increase.

Bulk testing was performed at dental clinics on metal fillings in patience suffering from allergies to dental metal that contains elements (allergens). Fillings that show a positive reaction are removed. Thus, not only must the alloy components used in the filling be determined but also the material that needs to be removed.

In this application brief we collect a small amount of metal from the filling of a patient, who is allergic to metal, using water-proof sand paper, and analyze the sample using the SEA5120 Micro X-ray Fluorescent Analyzer.

### 2. Measurement Method

#### 1) Measurement Conditions

Model	SEA5120
Collimator	1.8 mm
Applied Voltage	45 kV
Tube Current	8 $\mu$ A
X-ray Tube	Mo
Atmosphere	Air
Measurement Time	100 seconds

#### 2) Sample Collection Method

Water-proof sandpaper (Photo 1) is attached to a small silicon wheel by double-sided adhesive tape. As the wheel rotates against the metal filling, sample material collects as a powder on the sandpaper (Photo 2).



Photo 1 Preparation for connecting material

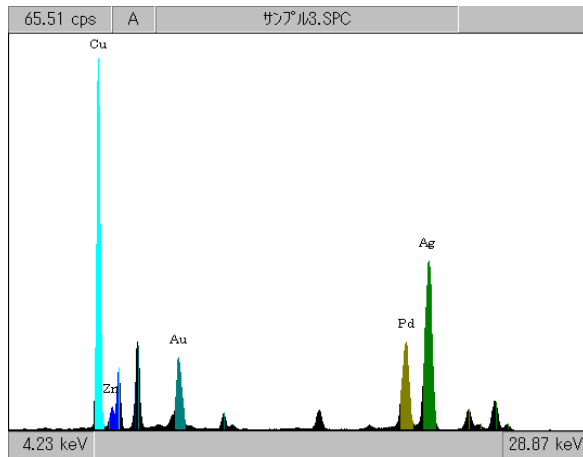


Photo 2 Oral collection process

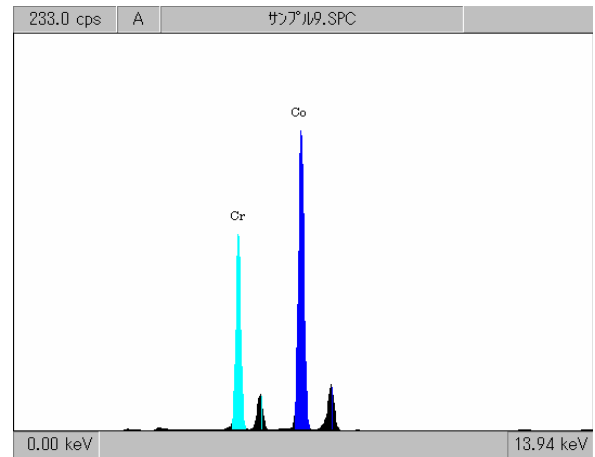
### 3. Results

The sandpaper is placed on the SEA5120 stage and qualitatively analyzed.

Spectrum 1) shows that filling A is an alloy of Cu, Zn, Au, Pd, and Ag. Spectrum 2) shows that filling B is an alloy of Cr and Co.



1) Fluorescent X-ray Spectrum of filling A



2) Fluorescent X-ray Spectrum of filling B

### 4. Summary

Patients at dental clinics who have metal allergies must have fillings that contain allergens removed. The fluorescent X-ray analyzer can conveniently identify metallic elements from tiny amounts of metal collected by sandpaper. This is an effective technique in dentistry for metal allergenic.