

## Quantitative Evaluation of the Composition of Au-Pd nanoparticles Using Neutron Activation Analysis

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### 1. Introduction

Neutron Activation Analysis (NAA) stands as a highly sensitive method for analyzing multiple elements today. This technique enables the retrieval of both quantitative and qualitative data for individual elements, boasting sensitivities that surpass those attainable through alternative analytical methods.

Inductively coupled plasma mass spectrometry (ICP-MS) ICP-MS is typically used for the qualitative and quantitative evaluation of the composition of synthesized nanoparticles, but the pretreatment process required to prepare the analytical sample is relatively complex and demanding.

This study was conducted to apply NAA to the composition ratio analysis of Au-Pd nanoparticles synthesized at different ratios and to evaluate the results.

### 2. Methods and Results

#### 2.1 Simulation of NAA for Au-Pd Nanoparticles

In order to apply the analysis using NAA, the gamma rays emitted after neutron irradiation must be evaluated.

Therefore, a simulation using the program "NAA Pro" was performed to evaluate NAA before applying it to the composition analysis of Au-Pd nanoparticles.

#### 2.2 Synthesis of Au-Pd nanoparticles.

To evaluate Au-Pd nanoparticles with different composition ratios using NAA, nanoparticles were synthesized by varying the addition ratio of Pd to Au.

#### 2.3 NAA

The synthesized Au-Pd nanoparticles for NAA were irradiated with neutrons in the HANARO NAA irradiation facility, a research reactor, and the gamma rays of the nuclides produced were evaluated using an HPGe detector.

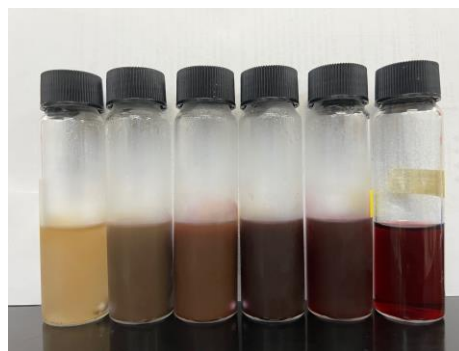


Fig. 1. Au-Pd nanoparticles synthesized by varying the amount of Pd added to Au..

### 3. Conclusions

NAA was applied to the quantitative analysis of the composition of the synthesized Au-Pd nanoparticles. The results of the analysis as a function of the amount of Pd added are currently being analyzed.

### REFERENCES