

Particle Size Measurement of Colloidal Palladium

Introduction

A palladium colloid is a suspension with a dispersed phase consisting of palladium particles between 1 nm – 1 μm evenly dispersed in a continuous phase, in this case DMF. The sample can be considered to be on the nanoparticle scale if the size of the dispersed phase particles is between 1-100 nm. Nanoparticles easily aggregate, so their surfaces are coated with organic molecules of various sorts to provide 3D barriers or to introduce electrostatic repulsive forces between them, thereby enhancing their dispersibility. The particle size distribution can be controlled by changing reducing conditions and protective agent types. Palladium is used in metallic alloys for hydrogen storage, electronic component materials, and dental materials. Palladium nanoparticles are used in many catalytic devices for various sorts of reactions. Examples include catalysts for purifying automobile exhaust gas (three-way catalysts) and those for use in the synthesis of acetaldehyde from ethylene (Wacker oxidation).

Analytical Test Method

Instrument:	SZ-100 nano Partica
Sample:	Palladium nanoparticles
Temperature:	25° C
Dispersing medium:	DMF
Algorithm:	Polydisperse, standard
Angle:	90°
Measurement duration:	90 seconds
Result format:	Number distribution

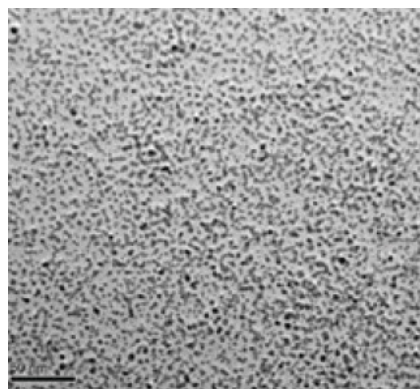


Figure 1: TEM photograph of colloidal palladium suspension*

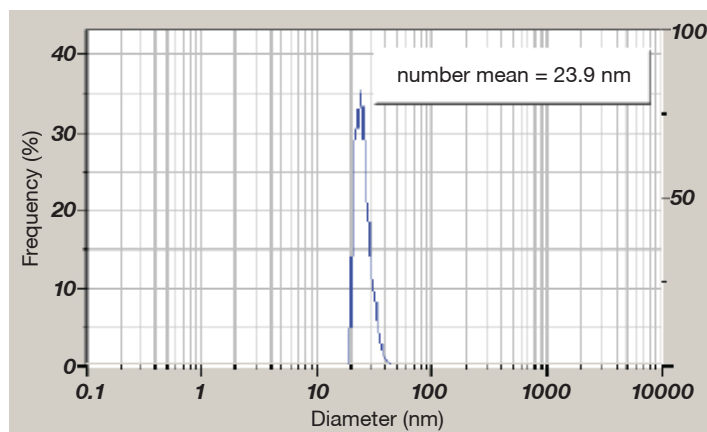


Figure 2: Colloidal palladium particle size result

Results

The measurement result of a palladium nanocolloid is shown in Figure 2. The mean diameter of this sample was 23.9 nm displayed as a number distribution. Results were generated based on the number distribution in order to better compare results to existing historic data based on microscopy.

*Photograph courtesy: Shinko Kagaku Co., Ltd., is not necessarily related to data shown in this document.