HORIBA Scientific

Application Data Sheet

SZ-Series Instruments
ADS131
Colloidal Copper

Particle Size Measurement of Copper Colloids

Introduction

A copper colloid is a suspension with a dispersed phase consisting of copper particles between 1 nm – 1 µm evenly dispersed in a continuous phase. The sample can be considered to be on the nanoparticle scale if the size of the dispersed phase particles is between 1-100 nm. The colloidal copper studied in this report is a suspension in which particles of copper of 100 nm or less in size are dispersed uniformly in hexane. Copper colloids are generally prepared by liquid phase reduction. The reducing agent type and the reducing conditions can be varied to obtain a copper colloid of a given particle size. Copper colloids are stabilized by coating their surfaces with high polymers to form 3D barriers or using the reduction potential of copper to impose repulsive forces between particles. Because of its electrical and thermal characteristics, high corrosion resistance and ease of machining colloidal copper is used for a wide range of applications including conductive ink, paste, and micro wiring.

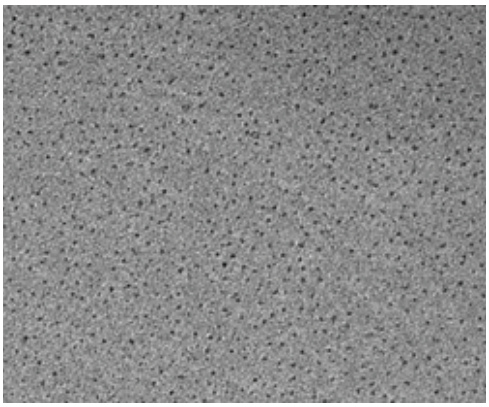

Figure 1: TEM photograph of colloidal copper*

Analytical Test Method

Instrument: SZ-100 nano Partica
Sample: Copper nanoparticles
Temperature: 25° C
Dispersing medium: Hexane
Algorithm: Polydisperse, standard
Angle: 173° Near cell wall
Measurement duration: 90 seconds
Result format: Number distribution

Results

The measurement result of a copper colloidal sample is shown in Figure 2. The mean diameter of this sample was 9.6 nm when 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.

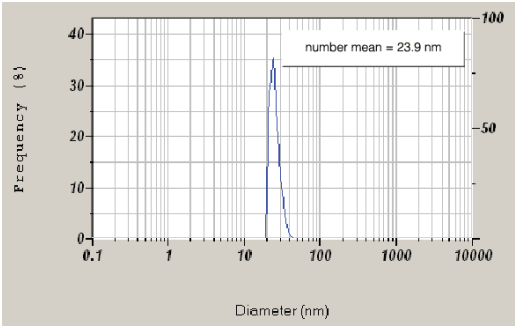

Figure 2: Colloidal copper particle size result

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

labinfo@horiba.com
www.horiba.com/us/particle
USA: (800) 446-7422 • **France:** +33 (0)1 64 54 13 00 • **Japan:** +81 (0)3 38618231