

## Separation of metal nano-colloids using micro ultracentrifuge

CS-GX II series and CS150NX series micro ultracentrifuge/S100AT6 fixed angle rotor

Metal nano-colloids are formed by dispersing metal particles 10 nm or smaller in surfactants or nonpolar solvents. These nano-colloids are used in making conductive inks, conductive coating materials and catalysts, and also in making biosensors. Pt, Pd, Fe, Co, Ni, Cu, Au, Ag, Ge, Sn and In are well known as single nanoparticles. This report describes our experiment on the separation and concentration of Ge particle samples having the lowest particle density among these single nanoparticles by using a micro ultracentrifuge.

We offer two types of micro ultracentrifuge: floor type CS-GX II series (CS150GX II and CS120GX II) and tabletop type CS150NX. Both types can be used under the following centrifugation conditions:

### Experiment

#### 1. Conditions for centrifugation

Centrifuge: CS150GX II micro ultracentrifuge

Rotor: S100AT6 fixed angle rotor (maximum capacity: 5 ml x 8 tubes)

Tube: 5PA seal tube (actual capacity 5.1 ml)

Speed: 100,000 rpm (maximum RCF: 604,000 x g)

Time: 7 hours

Temperature: 20 °C

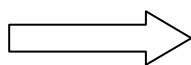
Sample: Ge particles (5 nm or smaller in particle size and 5.3 g/cm<sup>3</sup> in particle density, made by K.K. Shinko Kagaku Kogyosho)

Sample volume: 5.1 ml

#### 2. Experiment results



Before centrifugation



Precipitated Ge particles

After centrifugation

Supernatant

Precipitated Ge microparticles

### 3. Explanation

As shown in the experiment results on the previous page, Ge particles 5 nm or smaller could be precipitated by centrifugation at about 600,000 x g for seven hours. For this reason, we considered that other metal particles will be also precipitated and concentrating in the same means. This experiment suggests that ultracentrifuge technology could be effectively used in the separation, purification and concentration of metal nano-colloids.

The Ge particles used in this experiment were provided by K.K. Shinko Kagaku Kogyosho. Please visit the following web site for details of “metal nano-colloids” made by K.K. Shinko Kagaku Kogyosho.(Japanese site only)

URL <http://www.shinkou-kagaku.co.jp/>

#### Instruments



CS150GX II micro ultracentrifuge



S100AT6 fixed angle rotor\*



CS150NX tabletop micro ultracentrifuge

\*Sales of S100AT6 was discontinued.  
Alternative model is S110AT.

If you have any inquiry of this application or products, please contact us through our web site.

<http://www.hitachi-koki.com/himac/>

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