18. Identification of "Trigon" Particles of Gold Sol with Electron Diffraction

Eiji Suito and *Natsu Ueda*

(Goto Laboratory)

For the purpose of identifying the triangle andh exagonal particle crystallized and grown up in gold sol which was obtained by the reduction of acidic auric chloride solution with hydrogen peroxide, we adopted electron diffraction method using the same specimen that had been used for electron microscopy, as the electron microscope (SM-T4) could also be used as diffraction apparatus. We obtained the three kinds of diffraction patterns, one was a pattern of Debye-Scherrer rings and the other two were net-like patterns. Because of the fact that the particles were very large from the electron micrographical point of view in comparison with the wave length of the used electron beam ($\lambda=0.061$Å), the obtained pattern showed very coarse rings which indicated very good accordance with the standard rings obtainable under the same condition with a specimen of thin evaporated gold film. This showed that these particles were all gold crystals and not other material. When the beam was projected to a single triangle particle, two kinds of net-like patterns were obtained. One of them showed that the direction of the incident electron beam was parallel to the (111) plane of the gold crystal, and the other perpendicular to the same plane. On detecting the orientation of the particles to the beam direction, it became clear that from the arrangement of the indexed spots on the *N*-patterns, the triangle of hexagonal plane of the crystals corresponded to the (111) plane of the face centered crystal lattice of gold.

---

19. Colloid Chemical Studies on the Formation of Ultrafine Powder III. Carbonation of Aqueous Suspension Containing Magnesium Oxides or Hydrates

Eiji Suito and *Torao Fujita*

(Goto Laboratory)

In the previous report, (this Bull., 18 (1940) 117) we investigated on the formation of ultrafine $CaCO_3$ by the carbonation of CaO. Now, the chemical kinetics of

MgO or $Mg(OH)_2$ suspension by CO_2 gas and the properties (chiefly the particle size and the shape) of magnesium carbonate thus prepared was examined.

The purpose of this study is to obtain the good " filler " for transparent rubber from magnesite or dolomite.

The suspension of known concentration of MgO or $Mg(OH)_2$, prepared by adding NaOH to $MgCl_2$, was taken 500cc in a beaker and stirred constantly at a constant temperature and passing CO_2 with a definite velocity and the change of pH of the reacting solution was traced with time. After the reaction was finished, the supernatant liquid was titrated with 0.5N-HCl and the amount of magnesium bicarbonate was calculated. We obtained the following results.

(1) Reaction type: The curve of pH aginst time changed gradually from about pH 10.5 until it was kept constant for a while at about pH 8.8, changing again to about pH 7.7; and finally reached the end point of the reaction.

(2) Influence of the concentration of $Mg(OH)_2$: With the increase of the concentration of the sample, the reaction period also increased, whereas the amount of dissolved magnesia decreased.

(3) Influence of the concentration of CO_2 gas: With the increase of the concentration of CO_2 gas, the reaction period decreased, but it was almost constant when the concentrations was greater than 50%. The amount of dissolved magnesia became greater with the CO_2 concentration.

(4) Influence of the flow rate of CO_2 gas: The reaction period decreased, with the increase of the flow rate of CO_2 gas, whereas the amount of dissolved magnesia increased.

(5) Influence of the temperature: The relation between the temperature and the reaction velosity was very irregular: but the amount of dissolved magnesia decreased with increase of the temperature.

The composition of the precipitate at several stages of the reaction was examined by chemical analysis and found that the ratio of $MgCO_3$ to $Mg(OH)_2$ was greater with the reaction period. The precipitate at several stages of the reaction observed by the electron microscope.
