tion in the liquid phase and it agrees well with that measured by other methods.

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10. Studies on Microcrystals by Electron Microscope and Electron Diffraction. (III)

On the Colloidal Particles formed by Ultrasonic Stripping Method

Eiji SUITO, Natsu UYEDA and Yoshiaki SASAKI

(Suito Laboratory)

When a clean metal surface is dipped in the solution of an electrolyte, the reduced positive ions in the solution are deposited on the metal surface as the pure metal crystal, if the ionization potential of the former is lower than the latter. By the strong shearing action of the ultrasonic wave, these deposited metal crystal are stripped to fine particles and dispersed into the solution as colloidal suspension. Investigations were made in relation to these dispersed systems, especially in the morphological aspect of the particles with electron microscope and in their crystalline characters with electron diffraction patterns, as it was a problem of much interests whether such dispersed systems suffered oxidation by the subsidiary action of the ultrasonic wave. The reduced positive ions used in this studies were Cu, Zn and Pb, and were deposited from 0.05% $CuSO_4$, 0.05% $ZnCl_2$, and 0.1% $PbNO_3$ solution respectivly. The inserted reducing metals were Fe for Cu and Pb ions, and Mg for Zn ions. When ultrasonic wave, generated by a quartz plate forced to oscillate in a frequency of 800kc per second by driving circuit with SN-204, whose in-put power supply was about 300W, were applied to these systems, dispersion took place at once in the case of Pb solution whereas after an induction period of about 10 minutes in the case of Cu solution. For Zn solution, because of the acidity of the solution, hydrogen gas was evolved and the dispersing aspects were ambiguous.

Saturation points were reached after continuing snch ultrasonic dispersion for about 20-30 minutes, and the solution became turbid in black for Cu, and in white for Pb and Zn. These suspensions were separated from the inserted reducing metals, and purified by centrifugal sedimentation method. These three suspensions were named Sample A, B and C for Pb, Cu and Zn respectively.

Electron micrographs were taken for these samples and their morphologic characters, i.e. shapes, particle sizes and size distributions, were obtained. Except for Cu, Sample B, dispersed particles were all very thin crystals. This may show that these metals oriented on the inserted metal sur-

faces on deposition and crystallization. The Sample B was composed of secondary particles of fine elmentary particles which were 80 mμ in diameter. Sample C, Zn, contained very thin hexagonal crystals of 1-2 microns in size among finely dispersed particles. Sample A, Pb, contained thin oblong particles whose mean particle size was 210 mμ in length and 48 mμ in width.

We also investigated on the characters of these particles with electron diffraction method. The diffraction patterns obtained by ordinary apparatus gave us n-patterns and p-patterns, showing Debye-Scherrer rings of finely devided particles. Calculation gave us, through the agency of standard diffraction pattern of evaporated gold, the interplanar distances (d) of the fine crystalline metal particles. The analysis of these series of d suggested us that sample A, B and C were PbO, Cu_2O and pure Zu respectively. When Sample B was exposed to the air for about 10 days the diffraction pattern varied from Cu_2O to CuO, and it was inferable that the oxidation had taken place in atmosphere. The symmetricity of the n-patterns which were obtained for sample C, showed us that Zn particles had grown up towards the (110) plane which was perpendicular to the c-axis of the crystal structure.

By the above mentioned investigations it became clear that when ultrasonic wave was applied to the system of a solution of electrolyte and reducing metals inserted in it, stripping and dispersing action took place at the reducing metal surfaces,and except for the case that the acidity of the sloution was fitted to evolve hydrogen gas from the inserted metal surfaces, oxidation of the dispersed particles will take place by the subsidiary action of the ultrasonic wave, and for some metals this method is useful to prepare microcrystals which have various utilization for study of the "Electron-microdiffraction method".

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11. Studies of Organic Pigments by Electron Microscope

Eiji SUITO and Natsu UYEDA

(Suito Laboratory)

The particle sizes of organic pigments used for the so called "Pigment Resin Printing", whose utility has shown much progress lately, have been attracting much interests of many investigators because of their bright printing effects. Some investigators reported that the particle sizes of organic pigments were of a degree of a few microns, but they measured them rather indirectly. The present investigation was carried out in relation to their true particles sizes directly with electron microscope, and many other interesting results were obtained. The pigments used for the investigation