plex fibre structure, and the initial relation in which the hexagonal base plane was parallel to the surface of specimen, was likely to chang to the state in which the hexagonal c-axis was parallel to the surface of specimen after annealing for a longer time (e. g. 6 hr.)

It was considered that the above mentioned phenomenon observed after passing of two steps of transformations of c. p. h.→f. c. c.→c. p. h., might be resulted from both the grain growth by recrystallization and the transformation.

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6. Electron-Microscopic Studies on Vacuum-Evaporated Metallic Thin Films

Nobuji SASAKI and Ryuzo UEDA

(Sasaki Laboratory)

Our specimen-treating adaptor for electron-microscope (Rev. Sci. Instr., **23**, 136 (1952)) was slightly modified to prepare Al and Ba thin films on Formvar film by evaporation in vacuum. These were observed at once to see the effect of air.

The Al film, when very thin, is electron-optically uniform, but, when thick, somewhat granular. On exposure to air at room temperature, the contour of granules becomes slightly indistinct.

A freshly prepared Ba thin film is uniform, but assumes a mossy structure when exposed to air for 15 hours. Ba may have been acted by air.

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7. Absorption Spectra and Electron Microgram of Gold Sol

Eiji SUITO and Natsu UYEDA

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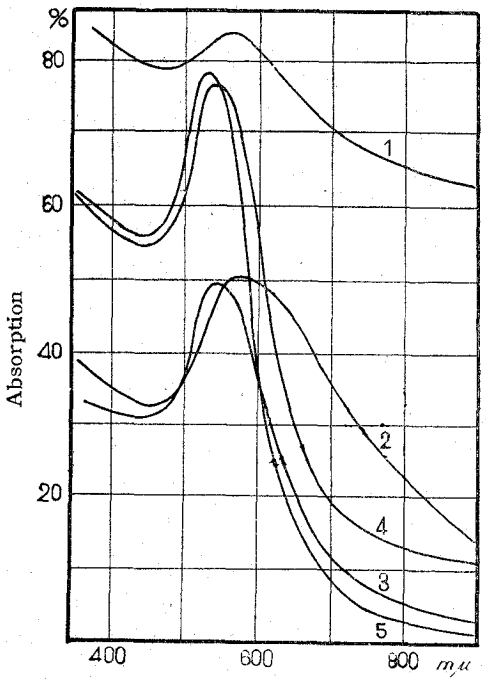
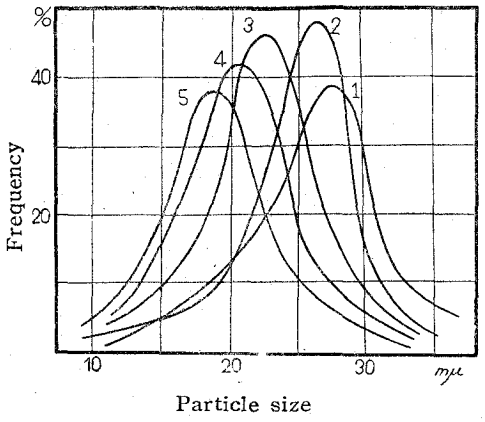
The relationship between the colour of gold sol and its particle size has been a problem of interest for many years. Electron micrographic determination of the particle size enabled us to detect the relationship more precisely. The gold sol used was that of Weimarn, which was prepared by reducing about 80 ml. of 0.005% aqueous auric chloride solution with about 1 ml. of basic formalin solution at room temperature. By changing the volume of reducing reagent solution added to the original solution by 0.2–2.0 ml. many kinds of gold sol, the colour of which varied from red to blue under transparent light, were obtained. The absorption spectra of these gold sol

were obtained with Beckmann spectrophotometer. They all showed absorption spectra of a similar type, which had maximum at about 5500Å and minimum at about 4500Å in wave length. The wave length of the maximum absorption λ_{MAX} moved from 5800Å to 5300Å as the colour of the sol varied from blue to red as shwon in Fig. 1.



Wave length

Fig. 1.



Particle size

Fig. 2.

Electron micrographs of gold particles of the sol were taken with SM-T4 and the diameters of the dispersed particles were determined directly by counting and measuring on the enlarged photographs. Fig.2 shows the particle size distributions obtained, and both mean diameters (d_{AV}) and most probable values (d_{MAX}) of the diameters were calculated.

The correlation between the particle size and the wave length of the maximum absorption were summarized in Table I.

Table 1.

No.	Color of Sol	d_{AV} (mμ)	d_{MAX} (mμ)	λ_{MAX} (Å)
1	Blue	40.2	44.5	5800
2	Violet	39.3	42.1	5780
3	Pink	34.6	34.3	5500
4	Rouge	32.6	31.5	5450
5	Red	29.6	29.0	5300

The Mie's theory, that the wave length of the maxium absorption decreased with the decrease of the particle size, were verified with a slight deviation, which was considered to be due to the existence of Au_2O particles in the solution imperfectly reduced with reagent.