When the silicon content was higher than about 2.8%, there was little influence of chromium up to about 0.1%.

(5) There was no influence of magnesium on the annealing time up to about 0.2% Mg, but with the further magnesium content the graphitization of pearlite cementite of nodular graphite cast iron seemed to be slightly hindered.

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19. Particles Size Determination by the Electron Microscope and the Light Scattering Measurement

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The intensity of the light scattered by the particles in solution depends on the angle at which it was observed, when the particle dimension is more than one twentieth of the wave length of incident beam. There is a dissymmetry in the angular distribution of the intensity, and the dissymmetry correlates intimately with size and shape of the solute particles. The relations of this effect to the dimension of the molecules have been evaluated by P. Debye for spherical, rod-like and random coiled particles in extreme dilution. (J. phys. colloid Chem., **51**, 18, 1947).

The experimental procedure consists of measuring the ratio of relative intensities $I(\theta_1)/I(\theta_2)$ of the light scattered at two different angles θ_1 and θ_2. If we adopt the dissymmetry coefficient [q] defined by B. Zimm as $[q]=I(\theta_1)/I(\theta_2)-1$ and $\theta_2=180°-\theta_1$, then from the Debye's calculations it is possible to evaluate L which shows the dimension of the particles in various shapes.

In order to verify the above theoretical relations and to test the accuracy of our arrangement (K. Kobayashi and H. Inagaki, J. Chem. Soc. Jap an (in press) and H. Inagaki, Shimazu Rev. 8, 16, 1951), the particle size of the suspension of polystrene obtained with the emulsion polymerization, was determined on one hand by the [q]-measurement, on the other hand by an electron-microscope. The diameter of particles was found to be 1200Å, by [q]-measurements, using the experimental values, [q] $50°\sim130°=0.56$, [q] $55°\sim125°=0.50$ and [q] $60°\sim120°=0.93$ with $\lambda'=5461$ Å/n, where n is the refractive index of the solution. This agrees closely with the value obtained from electron-micrographs on the same sample, which was 1230Å in average. On the determination of particle size by electron-micrographs, only the images of particles appearing in the central area of photographic plates were subjected to the measurement, to avoid the error based on the distortional aberration of the microscope.
