13. On the High Pressure Forming of Refractories. (I)

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A marked tendency of using high pressure in forming is seen lately in the manufacturing process of refractories. The trend is no exception in our country.

The present paper covers the results of the investigations on the specific volume, of silica brick having different grading.

Size classification of the material into coarse and fine grains has been carried out by means of screens, namely, 20–30 mesh per lineal inch for coarse grains, and 200-∞ mesh for fine grains. The mixes have been formed under different pressures, namely, 700, 1,000, 1,500 and 2,000 Kg/cm^2.

As long as the forming pressure is relatively low, the ratio of coarse and fine grains in the mix for obtaining the minimum specific volume is in good agreement with that estimated from the closest packing of the two kinds of particles having different diameters. With the increasing pressure, however, it was observed that the corresponding ratio for the maximum packing shifts by degree towards the mix containing coarser grains. This may be attributed to crushing of the particles due to high pressure, which has been verified by dispersing in water the pressed specimen and investigating the change in its grain size distribution. The crushing of the particles was observed to be the minimum at the point of the maximum packing and became more and more remarkable with the increasing difference of the mixing ratio, from this point.

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14. On the High Pressure Forming of Refractories. (II)

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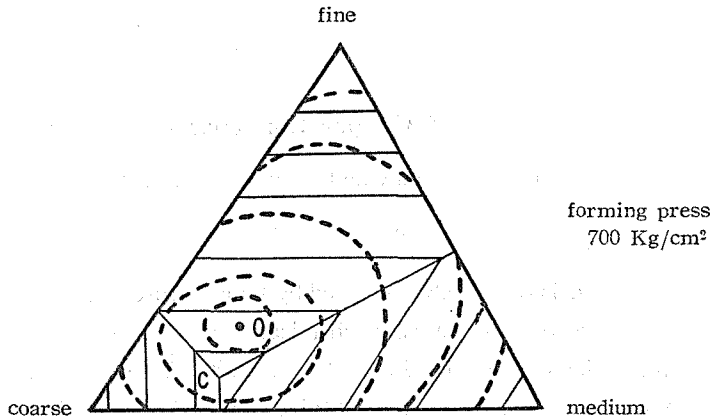
In succession to the previous study dealing with the two component system, a study on the characteristics of the specific volume of the same mix as before has been carried out, whereby the mix has, however, the grading of the three components: 20–30 mesh, 50–70 mesh, and 200-∞ per lineal inch, respectively. It has also different forming pressures ranging 400–2000 kg./cm^2.

The crushing of the coarse grains under high pressure was observed also in this case, which makes the point of the minimum specific volume O to shift gradually from the point C, the theoretical value, towards the apex of the coarse grain.

The observed lines of the specific volumes, given by a series of dotted lines, revealed the existence of the quite different relations between the specific volume and the grading from those estimated theoretically which should be represented by the assembly of straight lines.



15. On the Treatment of Copper and Cobalt Bearing Pyrite

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By pyrometallurgical method, the recovery of cobalt from copper bearing pyrite is difficult. However, by hydrometallurgy, copper and cobalt can be recovered profitably. In this study, roasting followed by leaching was investigated and best conditions of treatment were pursued on the copper and cobalt bearing pyrite whose composition was as follows:

Fe 37.34%, Cu 3.71%, Co 0.31% and S 42.76%.

The authors carried out experiments of chloridizing or oxidizing roasting and leaching with dilute sulphuric acid, and investigated the relations between the leaching degree of copper and cobalt and the conditions of roasting or leaching.

The roasting furnace used was of rotary kiln type, and leaching was carried out in the sample jar rotating on the pot mill of ca. 120 r. p. m..

Results obtained are as follows:

1) The suitable oxidizing roasting temperature for leaching copper and cobalt is about 550°C. And the leaching degree of components from this cinder (about 2.5% S) is

Cu 79%, Co 84% and Fe 5%.