Forming of Alumina

Hiroo Kobayashi

(College of Industrial Technology)

The forming of alumina powder is accomplished by many methods such as dry pressing, hydrostatic pressing, slip casting and vibration casting. This investigation is concerned with the wet vibration pressing of alumina powder with low load using a mechanical vibrator. The wet vibration pressing is a new process combined vibration casting or thixotropic casting and pressing. The use of vibration to assist the packing of dry ceramic powder is well known. But, the vibration compacting and pressing methods of dry ceramic powder are not widely used for industrial purposes, because the green density of the compacts formed by these methods is greatly influenced by many forming factors such as amplitude, frequency of vibration, vibration time and applied pressure.

Therefore, the wet vibration pressing with alumina soft-mud or slurry has been investigated in plaster molds. The applied pressure could be reduced to about one-tenth of that in conventional metal die pressing with dry alumina powder, becuase the moisture content is high enough to allow freedom of flow of alumina powder in this process. A minimum time of 60 seconds on vibration was necessary to achieve the maximum green density value. The forming factors of both amplitude and frequency of vibration had little influence on the green density of compacts over that time.

In this process with alumina soft-mud, the green density of compacts reached 60 percent in relative density. The green density increased remarkably compared with conventional die pressing, and it reached 70 percent or more in process with alumina slurry. The wet vibration pressing with low load may be valid for forming of thick or complicated shape products.