Experimental analysis of Ceramic Filling Rate according to Vibration characteristic

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1. Introduction

Ceramic powders have high thermal conductivity and insulation properties, and are in the spotlight as a thermally conductive material, so research is being carried out to increase the filling rate of ceramic powder. In this paper, as a basic experimental stage for analyzing the thermal conductivity performance according to the mixing of ceramic powder, a test analysis was performed to improve the filling rate of commercial alumina powder. According to the Horsfield's packing model, the three particle sizes adjusted the distribution of alumina powder, vibrating the prepared powder to improve the filling rate. The filling rate was measured experimentally and the filling rate according to frequency and amplitude was analyzed.

2. Vibration experiment

After drying at 150°C for 2 hours to remove moisture from the alumina powder, the powder ratio according to the Horsfield's packing model was set and the alumina powder was mixed using roll mill. The design of experiments, central composite design was used. The number of vibration experiments with frequency and amplitude variation was set and the vibration experiment was repeated 30 times to analyze the packing density of alumina powder. The components of the vibration experimental device are as shown in Fig.1.

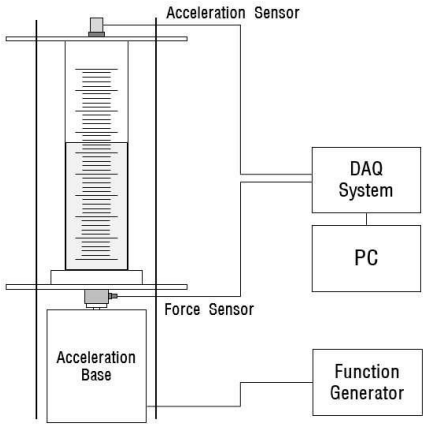

Fig.1 Schematic diagram of experimental setup

3. Analysis of the results

In this paper, three different particle sizes of alumina powder were mixed. The packing density was analyzed by vibrating the mixed alumina powder. Fig.2 is an alumina powder packing density graph with frequency and amplitude.

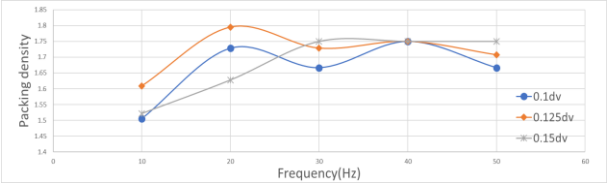

Fig.2 Results comparison

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