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A METHOD FOR PURIFYING CERAMIC POWDER FOR ELECTRONIC PARTS

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Translation of Japanese Patent No. 55-19006, May 23, 1980, pp. 21-22.

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16. Abstract

A method for purifying ceramic powder for electronic parts is described. Impurities can be easily removed by this method. This method removes alkaline metals from ceramic power for electronic parts.

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(54) A METHOD FOR PURIFYING CERAMIC POWDER FOR ELECTRONIC PARTS

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(57) Scope of Patent Claim

A method for purifying ceramic powder for electronic parts /21* which is characterized by the fact that impurities are dissolved and removed from ceramic powder by adding a dilute acid to ceramic powder with a composite perovskite structure which is made from a titanate, zirconate, and stannate and is synthesized by a solid phase reaction.

Detailed Explanation of Invention

This invention pertains to a method for purifying a ceramic powder used in electronic parts which is synthesized by a solid phase reaction.

In general, ceramic powders for electronic parts, such as $BaTiO_3$, $CaZrO_3$, $BaSnO_3$, etc., are synthesized by a solid phase reaction used in mass production. Nevertheless, the starting powder contains impurities, such as alkaline metals, etc., and ceramic powder synthesized by a solid phase reaction of this starting material is inadequate for electronic parts. Therefore, when ceramic powder for electronic parts that is very pure is necessary, very expensive pure starting materials must be employed or a liquid phase reaction, which is not suitable for mass production, must be carried out. In either case, production cost is high and therefore, the methods are impractical.

This invention solves the aforementioned problems. This invention presents a method for purifying a ceramic powder used for electronic parts whereby impurities, particularly alkaline metals, contained in ceramic powder that has been synthesized by a solid phase reaction can be easily removed.

*Numbers in margin indicate foreign pagination

That is, this invention is a method for dissolution and removal of impurities in ceramic powder by adding a dilute acid to ceramic powder with a composite perovskite structure, which is made from a titanate, a stannate, and a zirconate and has been synthesized by a solid phase reaction.

This invention will not be explained in detail with examples.

0.1 N acetic acid was added to ceramic powders of $BaTiO_3$, $CaZrO_3$, and $BaSnO_3$. Then the powder was washed several times with distilled water. The Na and K conterts were measured after the purifying treatment. A comparison of the Na and K contents before and after treatment is shown in Table 1.

Furthermore, ceramic powders used in the aforementioned examples were synthesized with the following treatments.

(1) $BaTiO_3$: $BaCO_3$ and TiO_2 were each weighed out so that the molar ratio would be 1:1. After they were mixed in a pot mill with the wet method, the powder was dried and baked for 2 hours at a temperature of 1200 C.

(2) $CaZrO_c$: $CaCO_3$ and ZrO_2 were each weighed out so that the molar ratio would be 1:1. The same treatment as in (1) was then carried out.

(3) $BaSnO_3$: $BaCO_3$ and SnO_2 were weighed out so that the molar ratio would be 1:1. The same treatment as in (1) was then carried out.

Table 1

sample	impurities	content (wt%) before treatment	after treatment
$BaTiO_3$	Na_2O	0.10	0.05
	K_2O	0.05	0.02
$CaZrO_3$	Na_2O	0.20	0.08
$BaSnO_3$	Na_2O	0.21	0.09

As can be seen from the results in Table 1, 50% or more of /22
the alkaline metal impurities contained in the ceramic powder are removed when the method in this invention is performed. Furthermore, although dilute acetic acid was employed in the aforementioned examples, other acids, such as dilute hydrochloric acid, dilute nitric acid, etc. can be used. Moreover, although only the case where $BaTiO_3$, $CaZrO_3$ and $BaSnO_3$ were used was shown, the method in this invention can be used on powders for electronic parts with a composite perovskite structure made from other titanates, stannates, and zirconates, such as $SrTiO_3$, $CaTiO_3$, $PbTiO_3$, $BaZrO_3$, $SrZrO_3$, $PbZrO_3$, $SrSnO_3$, and $CaSnO_3$.

Akaline metals can be removed from ceramic powder for electronic parts with the method in this invention. Therefore, commercial ceramic powders can be easily and inexpensively obtained with a high degree of purity. Moreover, there is an advantage with this invention in that the cost of the electronic part is also reduced. Consequently, this invention is useful from an industrial viewpoint.