

POWDERED INSULATORS FOR HIGH VOLTAGE APPLICATIONS

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Determining the dielectric strength of powdered metal oxides and metal hydroxides, to decide if there is a use for them in high voltage applications.

Abstract

Efficient distribution of AC electrical energy requires very high voltages, which in turn requires good insulation between components and systems. Commonly electrical insulators like epoxies, oils, ceramics and other hard insulators are used to protect equipment and people. These types of insulators can be hard to remove, toxic to humans if incorrectly recycled and hard to replace safely. The use of powdered insulators would allow them to be easily removed, and reused in the same equipment, even after an electrical fault.

Therefore, the point of this research is to determine if the use of powdered insulators are feasible, where previously they are typically frowned upon. The lack of research done on powdered insulators provides an interesting set of problems, primarily the lack of methodologies for testing how the electrical resistivity. Through the use of custom-made testing setups, several powders including metal oxides and metal hydroxides were tested to determine their dielectric strength with the available equipment.

We found that, testing the electrical resistivity of the powders was very difficult due to the effects of changes in humidity, temperature and even atmospheric pressure. After testing the three methodologies, the final setup provided results indicated that the sample has better electrical resistivity than air, and therefore making it a possible option as an electrical insulator.