

ABSTRACT

Study of the Microgeometry of Alumina Ceramic Substrate and its Effect on the Electrical Conductivity of Thin Gold Films

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The complex microgeometry of porous alumina ceramic substrate was investigated by the application of various theoretical models, from recent developments in the physics of sedimentary rocks and porous media in general, to measurements of the low frequency dielectric constant and electrical conductivity of the ceramic saturated with saline water.

Such a study provides a new and interesting method to investigate the microgeometry of composite materials and in particular the microgeometry of porous alumina ceramics.

Having studied the microgeometry of the ceramic substrate, the effect of the texture of the substrate on the electrical conductivity of thin gold films was investigated by the application of various theoretical models to the frequency dependent conductivity measurements of the gold films. These models are related to the scattering mechanism of conduction electrons in the thin films, as well as the conductivity behaviour in the critical regime.

This study clearly indicates that, the texture of the substrate plays an important role in thin film conductivity.