Abstracts

A Sensitive Method for Measuring Complex Permittivity with a Microwave Resonator

G. Roussy and M. Felden. "A Sensitive Method for Measuring Complex Permittivity with a Microwave Resonator." 1966 Transactions on Microwave Theory and Techniques 14.4 (Apr. 1966 [T-MTT]): 171-175.

The proposed method was carried out to make easier dielectric studies em powders under controlled pressure when the frequency varies. A TE/sub 01n/-mode resonator is needed. The substance under test is contained in a tube of quartz, placed along the axis of a cylindrical cavity. The mathematical formulation for the complex permittivity is given in rigorously accounting for the presence of the tube. Typical ditticulties are discussed, and experimental results given. The absolute precision of the measurement can be compared with that of the classicrd method (±2 percent for epsilon' and ±10 percent for epsilon''). The greatest error arises from an insufficiently precise determination of the geometrical and electrical characteristics of the quartz tube. This error is systematic, and thus it is possible to demonstrate the very small permittivity variations (± 0.3 percent for epsilon' and ± 5 percent for epsilon'').

❑ Return to main document.