Abstracts

Dielectric Measurements on Polymeric Materials by Using Superconducting Microwave Resonators

W. Meyer. "Dielectric Measurements on Polymeric Materials by Using Superconducting Microwave Resonators." 1977 Transactions on Microwave Theory and Techniques 25.12 (Dec. 1977 [T-MTT] (1977 Symposium Issue)): 1092-1099.

This paper deals with the theoretical and practical investigation of a test method using superconducting cavity and helical resonators in an oscillator loop, which allows precision measurements to be performed on solid dielectrics in the range of 0.1-10 GHz, and below 9 K. The underlying formulas are an extension of the well-known perturbation formalism and are not restricted to low temperatures. Our experiments resulted in unloaded quality factors of Q = 5/spl dot/ 10/sup 7/, between 0.2 and 10 GHz, with a maximum Q (2.2 K, 0.19 GHz) of 9/spl dot/ 10/sup 8/, which enabled us to observe the smallest loss tangent so far: tan delta (2.2 K, 6.5 GHz) = (3.7 /spl plusmn/ 5 percent)/spl dot/ 10/sup -7/ in polyethylene.

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