Abstracts

Extended Cavity Perturbation Technique to Determine the Complex Permittivity of Dielectric Materials (Short Papers)

B. Meng, J. Booske and R. Cooper. "Extended Cavity Perturbation Technique to Determine the Complex Permittivity of Dielectric Materials (Short Papers)." 1995 Transactions on Microwave Theory and Techniques 43.11 (Nov. 1995 [T-MTT]): 2633-2636.

An improved measurement technique to determine the complex dielectric properties of materials has been developed that extends the validity of the conventional cavity perturbation technique for circular cylindrical rod-shaped samples in circular cylindrical cavities resonating in TM/sub 0n0/ modes. The method is particularly useful for the dielectric characterization of fragile, low-loss materials that are difficult to machine to typically required thin dimensions. The method further allows for multi-frequency measurements using higher-order radial modes and somewhat alleviates the very small cavity dimensions typically required by the conventional perturbation technique at higher microwave frequencies. A validity criterion for the extended method is given. Measurements of the complex permittivity of NaCl single crystals are presented, showing excellent agreement with theory.

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