The Analysis and Design of Open-Ended Coaxial Probe for Measurement of Dielectric Parameters of Liquids

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ABSTRACT

Open-ended coaxial line has been designed for the measurement of dielectric properties of liquids. These applications are based on the principle that characteristics of the reflection signals produced by the coaxial opening depend upon the sample material terminating the probe. Then the dielectric parameters of the material sample can be found by using the specific formulation for aperture admittance of coaxial probe and dielectric constant of material. This thesis used common 3.6 mm OD semirigid coaxial line and measured different materials with a vector network analyzer (VNA). Finally, a quasi-static approximation analysis of open-ended coaxial line has been formulated to determine the dielectric parameters of liquids under test.

Keywords : dielectric properties ; coaxial probe ; aperture admittance ; quasi-static approximation analysis

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