Abstracts

Dynamicm Measurement of the Temperature Characteristic of Dielectric Material for Microwave Application Using Photo Thermal Dielectric Microscope

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A new photo thermal technique for measuring the temperature characteristic of dielectric material for microwave application is proposed. It is based on the temperature characteristic of the dielectric constant of light irradiated material. When a dielectric material is illuminated with chopped light, an alternating variation of capacitance is caused by the heat produced due to light absorption and this variation is detectable with enough dynamic range and sensitivity. First, quantitative derivations are presented for the alternating capacitance variation in terms of the optical, thermal, dielectric and geometric parameters of the system. Next, a very high sensitive type of PTDM using the coaxial cavity resonator with operating frequency of microwave range is developed. Using this microscope, the temperature characteristics of the binary-system TiO2-Bi2O3 dielectric ceramics for microwave application are successfully measured.

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