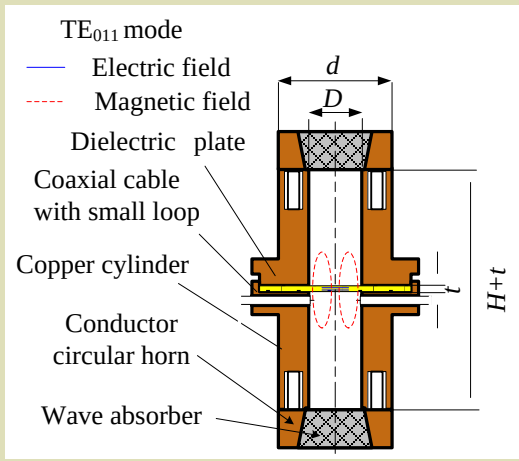
Complex permittivity measurement for dielectric materials in millimeter wave region 1

The cut-off circular waveguide method



(a)Circular cylinder resonator clamping a dielectric plate

Relative permittivity ε_r

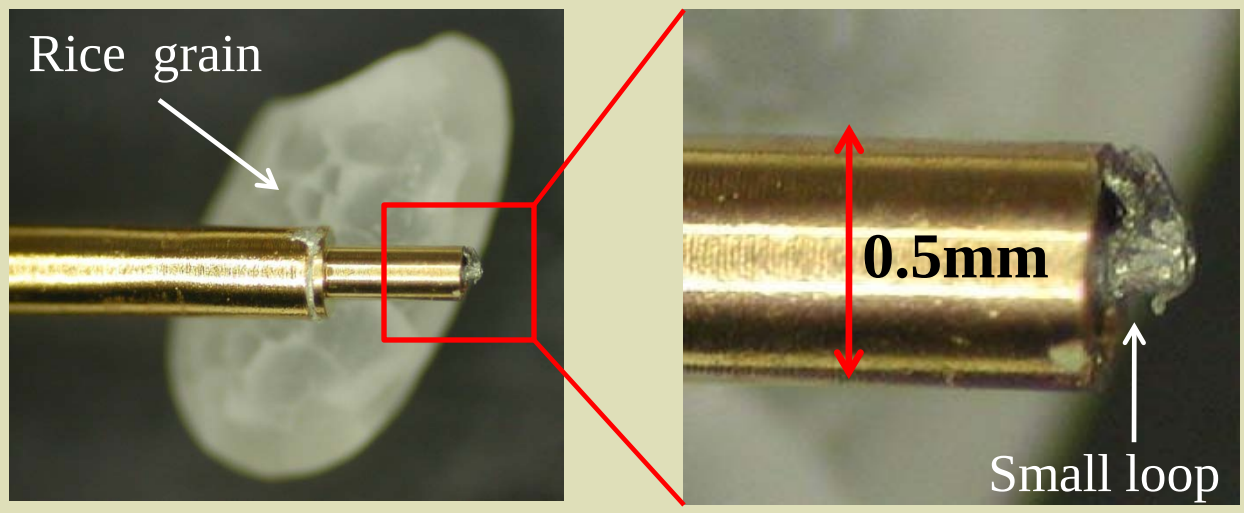
$$\det H\left(\varepsilon_r : f_0, t, d, D\right) = 0$$

Loss tangent $\tan\delta$

$$\tan\delta = A/Q_u - BR_s \qquad A, B \text{ :Constant}$$

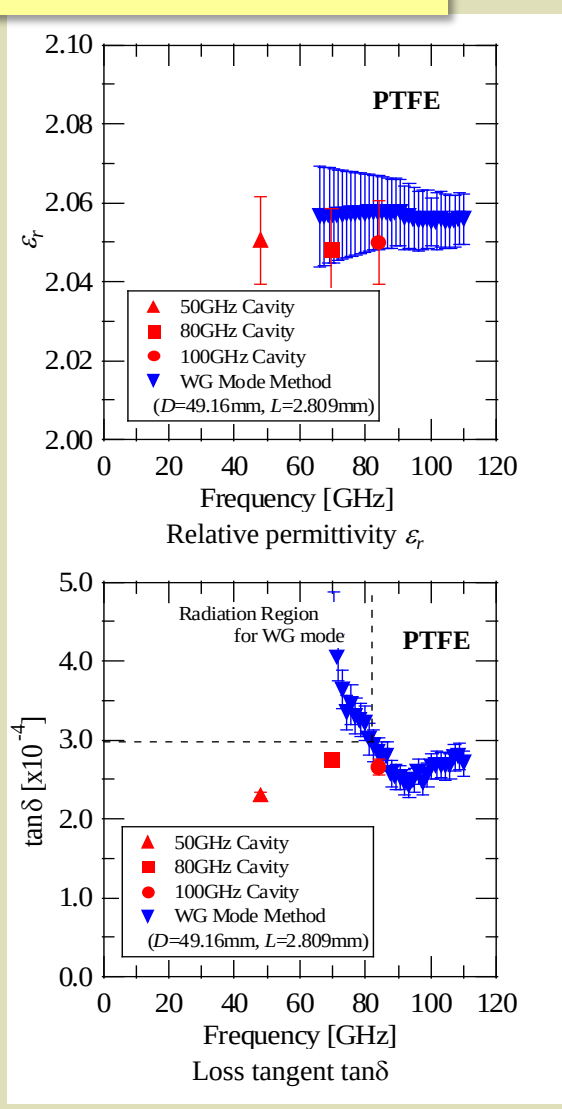
100GHz grooved circular cavity

(a)Fabricated cavity (KMCO)

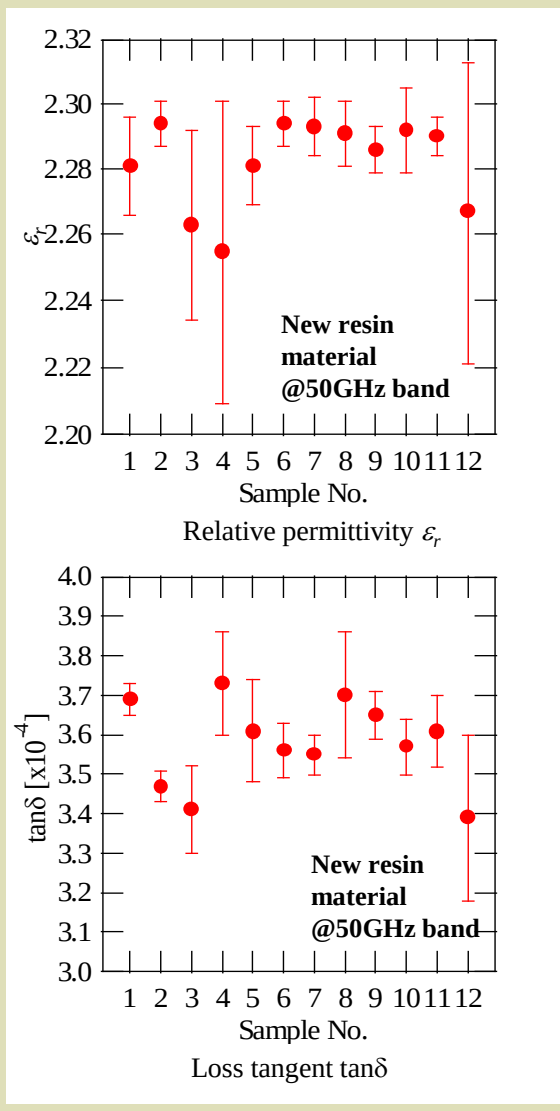


(b)Excitation cable

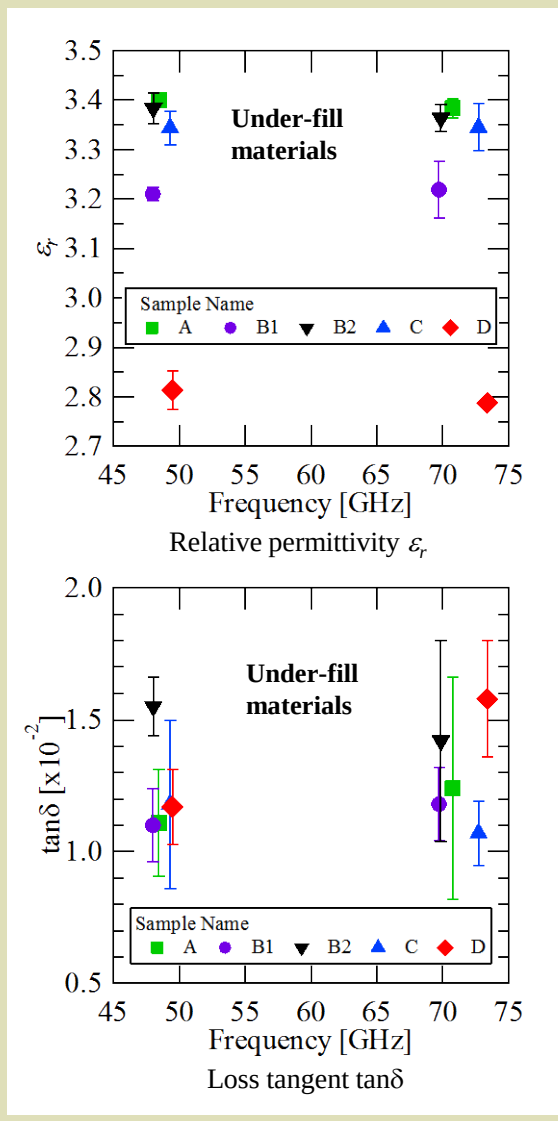
Measured results



(a)Comparison with WG mode resonator method



(b)Uniformity in plate of ε_r for a substrate(20cmx15cm)



(c)Measurement of middle loss material

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