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MICROWAVE DIELECTRIC ANALYSIS ON ADHESIVE DISBOND IN ACRYLIC GLASS (POLY (METHYL METHACRYLATE)) AT KU-BAND

Abstract

A microwave dielectric spectroscopy for detecting adhesive disbonds between acrylic glass (aka Poly (methyl methacrylate)) was discussed. The adhesive bond was developed using epoxy resin and acrylate. The level of joint disbond can be quantified using Young Modulus. In this work, the strength of bond is affected by radius of air void within adhesive bond. A high-frequency electromagnetic wave propagated through two joint acrylic glass with acrylate and epoxy adhesive using waveguide adaptor WR90 in conjunction with professional network analyser. This electromagnetic wave is reflected and transmitted at the bond interface due to mismatch impedance at adhesive bond. The output is a dielectric properties that characterizes the bond interface. The increment of Young Modulus leads to increment of dielectric constant and loss factor for epoxy resin and acrylates, respectively.

Keywords

Adhesive disbond; Dielectric constant; Loss factor; Young modulus