Abstracts

New Method for Measuring Properties of Nonhomogeneous Materials by a Two-Polarization Forward-Scattering Measurement

A.P. Toropainen. "New Method for Measuring Properties of Nonhomogeneous Materials by a Two-Polarization Forward-Scattering Measurement." 1993 Transactions on Microwave Theory and Techniques 41.11 (Dec. 1993 [T-MTT] (1993 Symposium Issue)): 2081-2086.

A new method for measuring properties of granular materials with a two-polarization scattering measurement combined with a free-space phase measurement is introduced. The theoretical background of the measurement method is presented. Laboratory measurements of the depolarized scattering cross sections of white rice, green lentils, polystyrene beads, polyethylene beads, and mixtures of them at 10 and 35 GHz with a vector network analyzer and two horn antennas are presented. Results are compared with those based on first-order multiple scattering theory. Laboratory tests of the measurement of the relative effective permittivity of different materials by a phase measurement are presented. Also, laboratory tests of the compensation of the effects of changes in the number density and the permittivity of the inclusions of mixtures using a phase measurement are presented. A low-cost measurement setup for industrial measurements is also suggested.

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