Abstracts

Reflecting Rubber Characteristics of Anisotropic Sheets and Measurement of Complex Permittivity Tensor

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Complex values of the permittivity tensor of robber sheets which are manufactured by the rolling process were estimated by the least-squares method using the reflection coefficient measured for normal incidence. First, the frequency characteristics of the reflection coefficients of a rubber sheet backed by thin aluminum were measured from 8.5 to 10.5 GHz by changing the rolling angle relative to the incident electric field. Next, the elements of the permittivity tensor were determined by the least-squares method from many data of measured reflection coefficients of the samples. Five kinds of rubber sheets containing carbon particles or fibers were selected, and circular pieces 30 cm in diameter were measured by this method. The complex permittivity tensors including off-diagonal elements were thus obtained, and the principal directions of the tensor were calculated from the measured permittivity tensor. The following facts were found through this analysis: The permittivity element in the rolling direction is about five times larger and the off-diagonal elements are small compared with the diagonal elements. The principal direction of the real part is different from that of the imaginary part for a certain kind of rubber sheet mixed with carbon particles.

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