Abstracts

Microwave properties of low-loss polymers at cryogenic temperatures

M.V. Jacob, J. Mazierska, K. Leong and J. Krupka. "Microwave properties of low-loss polymers at cryogenic temperatures." 2002 Transactions on Microwave Theory and Techniques 50.2 (Feb. 2002 [T-MTT]): 474-480.

Dielectric loss tangent and permittivity of polytetrafluoroethylene (Teflon), high-density (HD) polyethylene, and cross-linked polystyrene (Rexolite) were measured at temperature range from 28 to 84 K and frequency of approximately 18 GHz. The material properties were determined by measurements of the resonant frequency and the Q factor of a TE/sub 011/ mode cylindrical superconducting cavity containing a sample under test. It has been demonstrated that these materials exhibit very low losses at cryogenic temperatures (2/spl times/10/sup -6/ for Teflon, 5/spl times/10/sup -5/ for HD polyethylene and 1.1/spl times/10/sup -4/ for Rexolite). Due to low losses, these materials can be useful in construction of various high-Q factor microwave devices for operation at cryogenic temperatures.

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