Abstracts

Heating Pattern in a Multi-Layered Material Exposed to Microwaves (Short Papers)

M. Nachman and G. Turgeon. "Heating Pattern in a Multi-Layered Material Exposed to Microwaves (Short Papers)." 1984 Transactions on Microwave Theory and Techniques 32.5 (May 1984 [T-MTT]): 547-552.

The electromagnetic-induced heating pattern in a multilayered slab material exposed to uniform plane microwaves is studied. A general expression taking into account the multiple reflections at the interfaces is derived for the power dissipated per unit volume in the medium. A numerical method is developed for solving the heat transport equation describing the temperature distribution in this material. A steady, as well as a transient solution is obtained for either a Dirichlet- or a Neumann-type of boundary condition. The effect on the temperature distribution of a cooling fluid circulating inside the slab is considered. The method is applied to the special case of a three-layered material having characteristics similar to those of a biological structure. The possibility of achieving a preferential heating of one of the layers by, means of standing waves created with the aid of a flat reflector is demonstrated.

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