Abstracts

Power Absorption in Ferromagnetic Implants from Radio Frequency Magnetic Fields and the Problem of Optimization

Explicit expressions for absorbed power in small ferromagnetic cylinders from a radio frequency magnetic field (using a quasi-static approximation) due to induced eddy current circulation are obtained for implants used in interstitial hyperthermic therapy. It is found that optimum power absorption per unit volume of cylindrical implant occurs when the applied magnetic field is parallel to the axis of the cylinder and the induction number (i.e., /spl radic/ 2 times the ratio of implant radius to skin depth) is 2.5. This result is used to design geometrical configurations for implants to achieve optimum heating effects. The dependence of absorbed power on the orientation of the cylindrical implant with respect to polarization of the magnetic field is also calculated and found to be in good agreement with experimental results.

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