

Dependence of ultrasonic and magnetic hyperthermia on the concentration of magnetic nanoparticles

K. Kaczmarek,¹ T. Hornowski,¹ R. Bielas,¹ D. Żak,¹ and A. Józefczak¹

¹*Institute of Acoustics, Faculty of Physics,
Adam Mickiewicz University, Poznań, Poland*

Hyperthermia treatment is the heating of tumor tissue up to temperatures between 41°C and 45°C, which trigger several physiological reactions in the body. Hyperthermia within tissue can be applied through various mechanisms. One of them is magnetic hyperthermia which uses superparamagnetic iron oxide nanoparticles (SPION) heated by an externally applied magnetic field. SPIONs can also be used as sonosensitizers in ultrasound hyperthermia increasing acoustic wave attenuation. The impact of SPION concentration on thermal effect during ultrasonic and magnetic hyperthermia was investigated in agar-gel phantom with added magnetite nanoparticles. The presence of nanoparticles in the tissue-mimicking phantom increases the thermal losses of ultrasound energy and temperature of the phantom.

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