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In-situ dispersion and optical manipulation of magnetic carbon nanoparticles SUNIL GUSAIN, SAMARENDRA MOHANTY, ALI KOYMEN, UT Arlington — Magnetic carbon nanoparticles are finding increasing use in enhancing contrast of imaging and photo thermal therapy of cancer. However, conventional synthesis of these nanoparticles involves very cumbersome and skillful interventions. We developed a simple method for controlled synthesis of amorphous carbon nanoparticles using dense medium plasma generated in the cavitation field of an ultrasonic horn in Benzene using two metal electrodes. In this method, the electrode (magnetic) material is incorporated into the C nanoparticles, as confirmed by hysteresis curve, measured using SQUID magnetometer. TEM images showed that the size of the C nanoparticles is in the range of 8-14 nm and the electron diffraction established that these nanoparticles are amorphous. The absorption spectrum in near-IR region was measured to be of similar value as in the visible region, making it a very useful candidate for photothermal therapy using near-infrared laser in the biological window. These carbon nanoparticles aggregates and tend to form clusters. For in-situ dispersion of these nanoparticles, we made use of the absorption property of these nanoparticles using a focused near-IR cw laser microbeam (1064nm). We believe the magnetic property of these nanoparticles would allow effective localization in the tumor region by application of external magnetic field.

Samarendra Mohanty
UT Arlington

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