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Magnetic Nanoparticle-Based Hyperthermia and Theranostics

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Message from the Guest Editors

Magnetic nanoparticles (MNPs), essentially the ones displaying superparamagnetic properties, such as zero coercivity, display hyperthermia upon alternating magnetic field (AMF) stimulation. The ease of surface functionalization of MNPs allows their conjugation with anticancer drugs to achieve hyperthermia-induced chemodrug dissociation, resulting in controlled drug release. This behavior can be widely exploited by biomedical engineers in cancer theranostics considering the property of enhanced chemodrug sensitivity by the cancer stroma. Another advantageous feature of MNPs is their ability to affect T1 or T2 relaxation rates, thus enabling their applications as contrast agents in magnetic resonance imaging. Thus, multi-functional MNPs are attractive candidates for simultaneous tumor imaging and therapy, and thus, theranostics. A plethora of research has therefore been conducted to conceptualize the design of MNPs for biological applications. The latest trend involves the fabrication of biomolecule-tagged MNPs for cancer-cell-specific ingestion, thereby limiting harm to the healthy stroma. Thus, MNP-induced hyperthermia is a new rising field of interest.

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Message from the Editor-in-Chief

Nanoscience and nanotechnology are exciting fields of research and development, with wide applications to electronic, optical, and magnetic devices, biology, medicine, energy, and defense. At the heart of these fields are the synthesis, characterization, modeling, and applications of new materials with lower nanometer-scale dimensions, which we call “nanomaterials”. These materials can exhibit unusual mesoscopic properties and include nanoparticles, coatings and thin films, metal–organic frameworks, membranes, nano-alloys, quantum dots, self-assemblies, 2D materials such as graphene, and nanotubes. Our journal, *Nanomaterials*, has the goal of publishing the highest quality papers on all aspects of nanomaterial science to an interdisciplinary scientific audience. All of our articles are published with rigorous refereeing and open access.

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