Yi Jun Liang et al., J Nanomed Nanotechnol 2016, 7:5 (Suppl)
http://dx.doi.org/10.4172/2157-7439.C1.043

Design and synthesis of magnetic nanoparticles by microwave strategy

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In the past few years, numerous investigations have utilized the high quality magnetic nanoparticles in bio-applications, ranging from cancer therapy to bio-sensing applications for specific diagnosis, all due to their unique magnetic properties to solve mass practical issues. To the best of our knowledge, the magnetic nanoparticles can be synthesized by chemical methods, such as sol–gel, thermal decomposition, sol-or hydrothermal reaction and co-precipitation. Recent studies have demonstrated this issue to be promising and exciting. However, these approaches mentioned above centrally, over some points, have restricted further supporting of the reliability and stability of mass fabrication, though they were known as the conventional technique that possess long been recommended as well as well-defined morphology and narrow size distribution. In microwave matrix, energy output and thermal feedback is uniformly distributed and responsive to minimize thermal gradient, hence could be leading enhanced reaction rate and should be more appropriate to achieve the aim. Here, attention is focused on demonstrating that hypothesis. We engaged, in this issue, to develop a universal synthesis strategy for the magnetic nanoparticles preparation, and the products own the outstanding performance which can be differentially modified to expand and/or improve their functions, thus considered as the highly promising biomedical nanomaterials. As stated, our powerful strategy is of relevance for a broad range of applications, which could also be extended to exploit other monodisperse NPs benefiting from its important advantageous features.

Biography

Yi Jun Liang, as a PhD candidate, joined the Lad of Nano Biological Materials and Devices in Southeast University, 2013, under the supervision of prof. Dr. Gu and Prof. Dr. Zhang. Currently, his research interests include the preparation of multifunctional magnetic nanoparticles for integration of diagnosis and treatment of cancer, and developing the microwave ultra-fast strategy for achieving magnetic nanomaterials production in commercial scale.

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