

3rd International Conference and Exhibition on **Biosensors & Bioelectronics**

August 11-13, 2014 Hilton San Antonio Airport, San Antonio, USA

Magnetic nanoparticles-based microfluidic sensing system for genotyping, CTC measurement and therapeutic monitoring

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Magnetic nanoparticles own unique Giant Magnetic Resistant (GMR) and giant magnetic Impedance (GMI) effects, how to employ fully two kinds of effects to solve disease diagnosis and therapeutic problems has become our concerns. Herein, the main advances of magnetic nanoparticles and microfluidic chips-based sensing systems applied for virus genotyping, circulation tumor cell detection, as well as therapeutic monitoring in our group in recent years have been reviewed. We established scale controlled synthesis methods of magnetic nanoparticles; using MEMS techniques to prepare microfluidic chips, integrating loop-mediated isothermal amplification and GMR sensors, realized the HBV and HPV quick gene typing. We also designed and prepared GMI-based microfluidic system, and realized CTC capturing and quantification, we also designed and prepared other sensing system to realize the therapeutic effect monitoring. These prepared microfluidic sensing systems own great potential applications in clinical tumor early diagnosis and biomedical engineering in near future.

Biography

Daxiang Cui, obtained his MD and PhD in Fourth Military Medical University in 1998, was a post-doc staff in Max Planck Institute for Metals Research from 2001 to 2004, was a visiting Professor in Waseda University from 2007 to 2008, so far he is a distinguished Professor in Shanghai Jiaotong University, his research interests include synthesis and biosafety evaluation of nanomaterials, nanoparticles-labeling and nano-effects-based ultrasensitive detection methods and biosensors, structure and function of genes or proteins. Up to date, he has published over 180 papers in international peer-reviewed journals such as *Advanced Mater*, *Nano letters*, *Biomaterials*, *Adv. Fun. Mater.*, *Cancer Res.*, *Biosensors & Bioelectronics*, etc., and his papers were cited over 3200 times, H-Index is 31. He is also invited to give 25 talks in international conferences, published 8 books, he is editor-in chief of *Nano Biomed Eng*.

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