Bio-spectroscopic sensing

Sensing of changes in the spectroscopic properties of organic fluorochromes or nanoparticles (NPs) on their interaction with analytes (targets) can be used for analyte detection. This technique has been extensively investigated and is used widely in the analysis of biological substances because of its high sensitivity and excellent temporal and spatial sampling capability. In some cases, spectroscopic sensing produces signals that are visible to the naked eye. Current topics of investigation in this area include the following: (a) development of *in situ* spectroscopic traps/sensors for real-time analysis; (b) preparation of materials with long-wavelength features to reduce background signals and biological damage; (c) design of chiral spectroscopic sensors for the analysis of biological chiral compounds; and (d) development of site-specific labeling methods to acquire local information on biomacromolecules.

To highlight recent progress in biospectroscopic sensing research, six papers, including one review and five research articles, are published in this special topic. The review by Qian group [1] covers the fabrication method for gold nanoshells and their applications in bio-spectroscopic sensing, and includes many results from their recent studies. The study by Zhao group [2] discusses development of a facile approach for the synthesis of “inert dye” doped fluorescent silica NPs. The prepared NPs are stable and brightly fluorescent in aqueous solution, and have great potential for bio-analysis. Li group [3] developed a homogeneous fluorescence resonance energy transfer (FRET) method for single nucleotide polymorphism assay by integrating rolling circle amplification and cationic conjugated polymers. Yang group [4] reports a highly selective and sensitive fluorescent probe for singlet oxygen based on intramolecular FRET of anthryl appended porphyrins. Tang group [5] designed and synthesized a near-infrared fluorescent probe (BODIPY-Se) to detect F⁻ ions, and found that it could be used to image F⁻ in HepG2 cells. Ma et al. [6] describes a water-soluble FRET probe for HOCl and its use in fluorescence imaging of HOCl in HeLa cells.

- 1 Xu B B, Ma X Y, Rao Y Y, et al. Plasmonic biosensors and nanoprobe based on gold nanoshells. *Chinese Sci Bull*, 2011, 56: 3234–3241
- 2 Mu X, Wu C L, Lai J P, et al. A facile and general approach for the synthesis of fluorescent silica nanoparticles doped with inert dyes. *Chinese Sci Bull*, 2011, 56: 3242–3246
- 3 Tang Z Y, Cheng Y Q, Du Q, et al. Integration of rolling circle amplification and cationic conjugated polymer for homogeneous detection of single nucleotide polymorphisms. *Chinese Sci Bull*, 2011, 56: 3247–3252
- 4 You M X, Wang Y X, Wang H, et al. Fluorescent detection of singlet oxygen: Amplifying signal transduction and improving sensitivity based on intramolecular FRET of anthryl appended porphyrins. *Chinese Sci Bull*, 2011, 56: 3253–3259
- 5 Gong W, Su R X, Li L, et al. A near-infrared fluorescent probe for fluorine ion and its application in the imaging of HepG2 cells. *Chinese Sci Bull*, 2011, 56: 3260–3265
- 6 Jia J, Ma H M. A water-soluble fluorescence resonance energy transfer probe for hypochlorous acid and its application to cell imaging. *Chinese Sci Bull*, 2011, 56: 3266–3272

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