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Bioanalytical applications of gold nanoparticle probes

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In the past two decades, gold nanoparticles (GNPs) have been extensively studied and widely employed as probes for sensing/imaging wide ranges of analytes/targets, and building blocks for fabricating nanostructures and/or nanodevices. For instance, massive GNP-based colorimetric assays have been developed for detecting different targets including metallic cations, small molecules, nucleic acids, proteins and cells, because of their unique optical properties (known as “surface plasmon resonance” (SPR) or “localized surface plasmon resonance” (LSPR)). Here, a series of functionalized GNPs have been prepared, which can be employed as probes/labels for developing microarray-based assays and colorimetric assays. We have demonstrated that these assays can be used to (i) detect metal ions (e.g., Al^{3+} and Pb^{2+}) and biomolecules (e.g., $A\beta_{1-42}$) both in aqueous solution and living cells, (ii) identify substrates and inhibitors of kinases, (iii) determinate binding affinity of lectin with glycans and living bacteria/cells, and (iv) study the interactions of antibiotics with bacteria/cells.

Biography

Zhenxin Wang has been a Professor at Changchun Institute of Applied Chemistry (CIAC), Chinese Academy of Sciences since 2006. He graduated from Jilin University (China) in 1994 and obtained his PhD degree from CIAC at the end of 2000. As postdoctoral research fellow, he spent more than 5 years in UK. Now at CIAC, his research focuses on development of microarray-based assays and nanoparticle-based colorimetric/imaging methods for detecting biological specific recognition events. He has published more than 60 research articles in international journals including *Journal of the American Chemical Society*, *Chemical Communications*, *Analytical Chemistry*, *Langmuir*, and *Biomaterials* etc.

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