

Research Profile

Name: Ding Xiaokang
Position: Associate Professor
Institute/division: Beijing University of Chemical Technology
Email: dingxk@mail.buct.edu.cn
Tel: 13522317417



SUMMARY OF MY RELEVANT RESEARCH AREAS:

Brief summary of your research areas, in English just a short paragraph please

Biosensors for visual detection of biomolecules; Liquid crystal based immunoassays; Microfluidic devices; Amplification-by-polymerization; Liquid biopsy for disease diagnosis

Brief summary of your research areas, in Chinese we will translate this for non-Chinese speaking UK participants

生物分子的可视化检测；基于液晶的免疫分析；微流控器件；通过聚合反应放大检测信号；液体活检疾病诊断

Primary Research interests: A fuller description of your main research areas.

Sensitive protease assays for diagnostics of cardiovascular diseases: Cardiovascular diseases (e.g. myocardial infarction) are becoming severe threat among ageing populations. Rapid and sensitive detection of matrix metalloproteinase (MMP-2 or MMP-9) in serum is important to differentiate MI from other diseases with similar symptoms. We developed a peptide-functionalized poly(methacrylic acid) brushes which were grafted from silica nanoparticles. The peptide was cleavable to proteases, thus the fluorescein labeled peptide fragments can be released into the solution for sensitive protease assay. In a proof-of-concept study, the LOD for detecting trypsin can reach 0.8 picomolar owing to the large surface-to-volume ratio of the silica nanoparticles. More importantly, this strategy is versatile, and a successful detection of MMP-2 is also demonstrated with an LOD of 1.1 picomolar.

Liquid crystal based visual immunoassays: Visual detection of protein biomarkers is important for developing point-of-care diagnostic devices. Liquid crystals are birefringent materials which are able to transduce the presence of protein biomarkers into optical signals. We developed a liquid crystal based immunoassay device that can be used at remote areas where the resources are limited.

Topics in which you would like to develop collaborative research:

Please indicate here research areas for which you would like to find partners to undertake joint research.

We intend to seek collaboration in the research areas of developing novel materials and technologies for biosensing to promote the healthcare of ageing people.

Relevant existing collaborations (academic/clinical/commercial) inside or outside China.

Include here any relevant collaborations you have

We currently have one collaboration with Beijing Institute of Heart Lung And Blood Vessel Diseases, Anzhen Hospital, jointly supported by Beijing Natural Science Foundation and Beijing Academy of Science and Technology (L160004).

Relevant graphics, figures, pictures:

Use this area to show pictures or scientific figures which illustrate your research

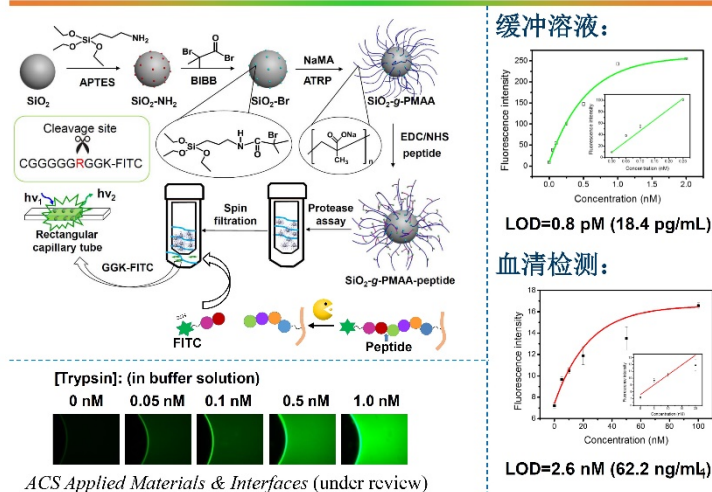


Fig. 1 Sensitive protease assays using peptide functionalized PMAA brushes

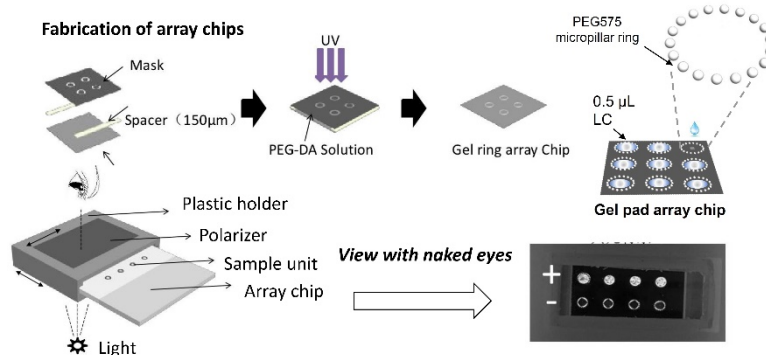


Fig. 2 The liquid crystal based biosensing device for label-free visual immunoassay

Publications and other outputs relevant to your interest in this programme (up to 5)

Please give references to your key recent research publications

- (1) Yuan, H.; Yu, B.; Fan, L.-H.; Wang, M.; Zhu, Y.; **Ding, X.***; Xu, F.-J.*. Multiple Types of Hydroxyl-Rich Cationic Derivatives of P_{gma} for Broad-Spectrum Antibacterial and Antifouling Coatings. *Polym. Chem.* **2016**, *7*, 5709-5718.
- (2) Huang, Y.; **Ding, X.**(co-first author); Qi, Y.; Yu, B.*; Xu, F.-J.*. Reduction-Responsive Multifunctional Hyperbranched Polyaminoglycosides with Excellent Antibacterial Activity, Biocompatibility and Gene Transfection Capability. *Biomaterials* **2016**, *106*, 134-143.
- (3) **Ding, X.**; Yang, K.-L.*. Quantitative Serine Protease Assays Based on Formation of Copper(ii)-Oligopeptide Complexes. *Analyst* **2015**, *140*, 340-345.
- (4) **Ding, X.**; Yang, K. L.*. Antibody-Free Detection of Human Chorionic Gonadotropin by Use of Liquid Crystals. *Anal. Chem.* **2013**, *85*, 10710-10716.
- (5) **Ding, X.**; Yang, K. L.*. Development of an Oligopeptide Functionalized Surface Plasmon Resonance Biosensor for Online Detection of Glyphosate. *Anal. Chem.* **2013**, *85*, 5727-5733.