TOTAL INTERNAL REFLECTION FLUORESCENCE: APPLICATION IN PROTEIN-MATERIAL INTERACTIONS

Nai-Ci Bing, Zhen Tian, Li-li Xie, Li-Jun Wang, Hao Yuan, Ming-Yuan Zhou, Hai-Ping Xu
School of Urban Construction and Environmental Engineering
Shanghai Second Polytechnic University
Jinhai Road 2360, Shanghai, P. R. China
E-mail:ncbing@eed.sspu.cn

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Protein-surface interactions play a significant role in drug delivery, biosensor technology, affinity or ion exchange chromatography and artificial materials under a biological environment. Many elaborate techniques have been applied for the investigation of protein density, structure or orientation at the interfaces. One particularly useful technique for studying protein surface-associated processes is total internal reflection fluorescence (TIRF). TIRF is fast, non-destructive, sensitive, versatile and real-time, in situ technique. In this paper, we described the principles and techniques of TIRF and summarized the broad range of TIRF and TIRF-electrochemical systems for detection and control of biomolecular interaction including protein-protein, receptor-ligand, protein-DNA, DNA-DNA, protein-membrane. These studies are providing enhanced understanding of protein-surface interactions and these recent developments in TIRF from protein-material interactions are likely to find future applications in monitoring and analyzing of other biomolecular interactions and studies of the mechanisms of biomolecular events.