

论文

单波长荧光交叉相关光谱单分子检测系统

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摘要:

基于激光共焦构型建立了一套单波长荧光交叉相关光谱检测系统, 并对检测系统进行了优化, 阐述了荧光交叉(相关)光谱基本理论. 以荧光量子点和有机染料为标记探针, 以人免疫球蛋白与羊抗人免疫球蛋白的结合反应为研究对象, 利用该系统成功地实现了在单分子水平上对免疫结合产物的分子数、浓度、特征扩散时间和动力学半径等参数的表征.

关键词: 荧光交叉相关光谱 单分子检测 单波长激发 量子点

Fluorescence Cross-correlation Spectroscopy Using Single Wavelength Laser Excitation

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Abstract:

The basic principle of fluorescence cross-correlation spectroscopy were introduced in this article. A setup of fluorescence cross-correlation spectroscopy(FCCS) was established with single wavelength laser. After the optimization of the setup, the detection volume is about 0.7 fL. This home-built setup was successfully applied for study of the binding reaction of human immunoglobulin G with goat anti-human immunoglobulin G. With quantum dots(745 nm) and Rhodamine B(580 nm) as probes and 532 nm laser beam as excitation source, the cross-talk effect was near completely suppressed. The molecule numbers in a highly focused volume, concentration, diffusion time and hydrodynamic radius of the reaction product can be determined by FCCS system.

Keywords: Fluorescence cross-correlation spectroscopy Single-molecule detection Single wavelength laser excitation Quantum dot

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