HELICAL CONJUGATED POLYELECTROLYTE BASED BIOMACROMOLECULE SENSING WITH FLUORESCENCE CORRELATION SPECTROSCOPY

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A novel conjugated polyelectrolyte (poly(phenyleneethynylene)) based biosensing method for avidin by using fluorescence correlation spectroscopy (FCS) will be presented. This poly(phenyleneethynylene) (mPPESO_3), which is helical in aqueous solution, can be intercalated by a tetramethylrhodamine labeled biotin compound (TMR-biotin) with biotin moiety extending to the surroundings. Upon addition of avidin to the mPPESO_3/TMR-biotin complex, large aggregates were induced by the crosslinking between polymer chains with avidin as the cross bridge. This process was signaled by a considerably longer diffusion time and highly intense fluorescence peaks shown up in FCS. The existence of “cross-link” events was further proved by atom force microscopy images. A study of fluorescence correlation curve as a function of [avidin] showed that the lowest [avidin]:[TMR-biotin] for successful detection of avidin is 0.1. Based on the FCS-assisted method, avidin can be sensitively detected with a detection limit lower than 100pM.