

Development and Characterization of 4,4-Dithiodibutyric Acid as a Monolayer for Protein Chips

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Despite considerable effort, the fabrication of protein chips using a self-assembled monolayer (SAM) with a long chain remains a challenge, due to its steric hindrance and the formation of disulfides, which may generate multilayers and block the terminal carboxylate groups of the SAMs, and thus reduce the sensitivity of the chips. To eliminate those problems, the feasibility of using a short-chain SAM, 4,4-dithiodibutyric acid (4,4-DTBA, disulfide), as a monolayer for the protein chips based on a gold surface was studied. Experiments for characterizing 4,4-DTBA were performed by contact angle goniometry, atomic force microscopy (AFM), Fourier transform infrared spectroscopy (FTIR) and ellipsometry. Additionally, a fluorescent assay of 4,4-DTBA was performed using protein A-fluorescein isothiocyanate (FITC). The results of 4,4-DTBA were compared with those of 11-mercapto-undecanoic acid (MUA). The comparison results indicate that 4,4-DTBA can be adopted as a monolayer for protein chips.

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