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# An interferometric imaging biosensor using weighted spectrum analysis to confirm DNA monolayer films with attogram sensitivity

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## Abstract:

Interferometric imaging biosensors are powerful and convenient tools for confirming the existence of DNA monolayer films on silicon microarray platforms. However, their accuracy and sensitivity need further improvement because DNA molecules contribute to an inconspicuous interferometric signal both in thickness and size. Such weaknesses result in poor performance of these biosensors for low DNA content analyses and point mutation tests. In this paper, an interferometric imaging biosensor with weighted spectrum analysis is presented to confirm DNA monolayer films. The interferometric signal of DNA molecules can be extracted and then quantitative detection results for DNA microarrays can be reconstructed. With the proposed strategy, the relative error of thickness detection was reduced from 88.94% to merely 4.15%. The mass sensitivity per unit area of the proposed biosensor reached 20 attograms (ag). Therefore, the sample consumption per unit area of the target DNA content was only 62.5 zeptomoles (zm), with the volume of 0.25 picolitres

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