Low-price and easy-to-make polypropylene substrate for inkjet-based oligonucleotide synthesizers

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Oligonucleotide microarrays are powerful tools widely applied in system biology, genomics, DNA storage, and other fields. We developed an in-house oligonucleotide synthesizer, OpenIDS, for microarrays based on open source.[1] Along with the development of a synthesizer using an Inkjet printer, a new synthesis substrate is also introduced. 144 wells are on a silicon wafer surface, achieved through photolithography.[2] Each well can serve as a feature by filling with CPG. Even though its dimension is only 200um-square within 15x25mm wafer, its density of features can be more scalable and increased by using photolithography. The wafer serves as a substrate template for PP substrate. Heated PP can copy the patterned CPG by stamping on the wafer. Exposed CPG on PP surface enhance contact with the synthesis solution. We demonstrate the manufacturing process for a new type of oligonucleotide synthesis substrate. The substrate is useful for the inkjet printer-based synthesizer which jets reagent onto a surface. Also, It offers the advantages of low-cost and repeatable production of substrate. Synthesized poly dT with the OpenIDS was validated through UREA-PAGE.

References

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[2] Saaem, I.; Ma, K.; Tian, J. Optimized in situ DNA synthesis on patterned glass. *MRS Online Proceedings Library (OPL)* **2009**, *1236*, 1236-SS1208-1224.