

PHOTOLITHOGRAPHIC SYNTHESIS OF HIGH-DENSITY DNA PROBE ARRAYS: CHALLENGES AND OPPORTUNITIES

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The continual need for increased manufacturing capacity in the production of GeneChip™ DNA probe arrays, and the expanding use of these arrays into new areas of application molecular medicine, has stimulated the development of new chemistries and production methods with higher efficiency and resolution. For current production methods based on contact photolithography, modifications in substrate materials and photo-activated synthesis reagents have provided significant improvements in array performance and information content ($\geq 4 \times 10^6$ sequences/cm²). A next-generation manufacturing process is also in development, which utilizes photo-acid generating polymer films, and automated projection lithography systems. This process has the ability to fabricate arrays with < one micron feature pitch, providing an unprecedented sequence density of $\geq 10^9$ /cm².