on-resonance will be higher than the fluorescence signal from an unpatterened glass substrate. Also, photobleaching is not an important issue for one-time scanning of DNA microarrays and protein microarrays.

6. Conclusions

This paper reports the design and fabrication of a PCEF surface that is fabricated upon a quartz substrate for low autofluorescence and high enhancement factors for simultaneous PC enhanced fluorophore excitation and PC enhanced fluorophore emission extraction. The PCEF surface gave a maximum enhancement factor of 7500 × for a ~50 nm thick layer of LD-700 (concentration of 538 ng/ml) doped SU-8 layer. Using dose-response characterization of deposited PPL-Alexa 647 spots of variable tagged molecule concentration, a SNR improvement of 330 × on the PC was demonstrated for the concentration corresponding to the LOD on an unpatterned glass surface. The LOD on the PC slide was lowered by 140 × compared to the LOD of PPL-Alexa on the glass control.

The PCEF surface can be used to provide lower detection limits for broad classes of surface-based fluorescent assays for applications that include DNA microarrays for quantification of gene expression, protein microarrays for detection of disease biomarkers in blood, and next-generation DNA sequencing applications that utilize fluorescent tags.

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