

Abstract Submitted  
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**Employing Grating Couplers in Biosensors** AMAL KASRY, WOLFGANG KNOLL, Max Planck Institute for Polymer Research — Grating couplers have become very important tool in developing optical biosensors. In this work, surface plasmon polaritons excited by a dye molecule on the surface of a grating were studied. These polaritons can couple out to bulk radiation by scattering from the grating, and the emitted light comes off in certain well-defined directions. We focused here in studying how the coupling between the emitted light of a chromophore at the surface of a metallic grating and the scattered surface plasmons depends on the chromophore-metal separation. This was done using a protein layer-by-layer system as a spacer between the metal and the dye. The results show that the back coupling efficiency is maximum at distance about 30-50 nm, which is also the optimum distance for the fluorescence intensity. These results agree with the results determined on a planar metallic surface, and the behavior of the fluorescence was proved to be the same in different media (air or liquid). It was also proved that the back coupling could still be seen at the high distance reached here (106 nm), where the surface plasmon can scatter till this high distance.

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