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High photoreactivity in a non-fluorescent photocleavable ligands on gold[1] HANS D. ROBINSON, CHALONGRAT DAENGNGAM, STEFAN V. STOIANOV, Virginia Tech Dept. of Physics, STEVEN B. THORPE, XI GUO, WEBSTER L. SANTOS, JOHN R. MORRIS, Virginia Tech Dept. of Chemistry — We report on the photo-patterning of a gold surface functionalized with a self-assembled monolayer of an *o*-nitrobenzyl-based photocleavable ligand bound to the gold surface with a thiol anchor. We find that the dose of UV light required to induce the photoreaction on gold is very similar to the dose in an alcohol solution, even though many optical phenomena are strongly suppressed on metal surfaces. We attribute this finding to a combination of the large skin depth in gold at UV wavelengths, the high speed of the photoreaction, and the spatially indirect nature of the lowest excited singlet. Any photoreactive compound where the quantum efficiency of fluorescence is sufficiently low, preferably no larger than about 10^{-5} in the case of gold surfaces, will show a similarly high photoreactivity in metal-surface monolayers. The implications of this result for optically driven self-assembly in plasmonic systems will be discussed.

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Hans D. Robinson
Virginia Tech Dept. of Physics

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