A Surface Plasmon Resonance Activated Photoreaction on Au Nanoparticles

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Gold nanoparticles combine unique optical properties with facile surface functionalization, thereby possessing exciting potential applications in many fields. Nanogold has already found use in the biomedical field as an imaging and drug delivery agent. In a novel approach, we have coated 20 nm diameter gold nanoparticles with a thiol-functionalized enediyne molecule. The enediyne moiety is already well-known to be reactive thermally and/or photochemically to produce a benzannulated product via a diradical intermediate. The potent radical chemistry of this class of molecules is of interest for its application towards medical therapies. In our system, the reaction of the surface coating can be triggered by exciting into the surface plasmon resonance band of the gold substrate. This represents an important first step in developing controllable, dynamic materials for biomedical use.