Photosynthesis of Unprotected Gold Nanoparticles in Aqueous Solution

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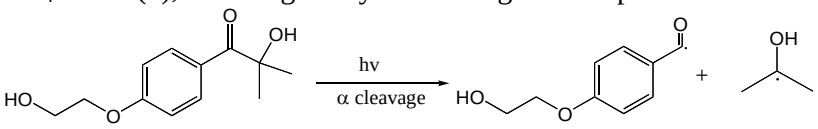
Stable, unprotected gold nanoparticles of 8-15nm in size were prepared in a simple, one pot, single step synthesis in an aqueous environment without the addition of stabilizing ligands. A photoinitiator was irradiated with UVA light producing ketyl radicals, which reduce $HAuCl_4$ to Au (0), initiating the synthesis of gold nanoparticles.



The optimal conditions and factors influencing the synthesis are discussed in detail. The synthesis of these nanoparticles was monitored by UV-VIS spectroscopy. TEM images of the particles were taken and analyzed to determine the range in size of the particles. The unprotected nature of these particles led to the study of possible interactions occurring between residual species and the gold nanoparticle surface. Feasible applications for the nanoparticles are also discussed.