

## Synthesis and Functionalization of Gold Nanostars for ROS Production

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**Abstract :** In this work, gold nanoparticles in star shape (called gold nanostars, GNS) were synthesized and coated by N-(3-aminopropyl) methacrylamide hydrochloride (PA) and mercaptopropionic acid (MPA) for functionalizing their surface by amine and carboxyl groups and then investigated for ROS production. The GNS with big size and multi-tips seem to be superior in singlet oxygen production as compared with that of small GNS and less tips. However, the functioned GNS in small size could also enhance efficiency of singlet oxygen production about double as compared with that of the intact GNS. In combination with methylene blue (MB+), the functioned GNS could enhance the singlet oxygen production of MB+ after 1h of LED750 irradiation and no difference between small size and big size in this reaction was observed. In combination with 5-aminolevulinic acid (ALA), only GNS coated PA could enhance the singlet oxygen production of ALA and the small size of GNS coated PA was a little higher effect than that of the bigger size. However, GNS coated MPA with small size had strong effect on hydroxyl radical production of ALA.

**Keywords :** 5-aminolevulinic acid, gold nanostars, methylene blue, ROS production

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