

Pulsed laser assisted decoration of 2D materials with plasmonic nanoparticles

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In recent years, two-dimensional materials (2D) attract the interest of various scientific disciplines because of their unique optical properties and the potential applications of these materials including optical, electrochemical devices and transistors. In our study, we report on an one-step method for effective decoration of graphene, molybdenum disulfide (MoS₂) and hexagonal Boron Nitride (h-BN) 2D layers with plasmonic metallic nanoparticles (NPs). Following single pulse UV laser irradiation of 2D sheets in AgNO₃ or HAuCl₄ solution, Ag and Au NPs are synthesized and grow on the layers' surface, respectively. The obtained plasmonic sheets are characterized by Scanning and Transmission Electron Microscopy as well as Raman and UV-vis spectroscopy. Our method is unique and important since no reducing agent is required in the reaction. The potential application of the synthesized plasmonic sheets in various components in solution processable transparent electronics is envisaged.

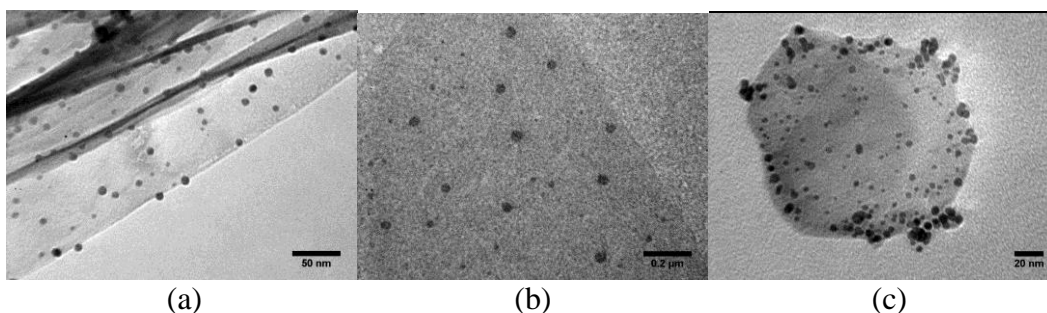


Figure 1 : a) GO_Ag NPs, b) GO_Au NPs and c) BN_Au NPs after single UV pulse laser irradiation

References

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