

Title: Novel insight on the potentialities of ligand-free pulsed laser ablation of a gold target in water: synthesis of biocompatible functional carbynoid nanostructures Novel insight on the potentialities of ligand-free pulsed laser ablation of a gold target in water: synthesis of biocompatible functional carbynoid nanostructures

Name: TAHIR
Pontifical Catholic University of Rio de JaneiroRio de Janeiro, Brazil

The synthesis of gold nanoparticles (AuNPs) by ligand free Pulsed Laser Ablation in water is not studied in details in literature due to the difficulties in obtaining colloidal dispersion of AuNPs with controlled dimensions, specific Localized Surface Plasmon Resonance and long-term stability [1] without the addiction of specific stabilizing agents or post synthesis irradiation processes [2,3]. We find that, under specific experimental conditions, the ablation of a gold target in water environment enriched by NaOH, leads to the simultaneous synthesis of long-term stable Au@carbynoid nanocomposites (NCs) [4] containing a carbon-rich shell with mixed sp-sp^2 hybridization, together with luminescent sp^2 carbon dots (Cdots).

Varying the experimental parameters, we are able to control both the dimension and the blue shift of the LSPR band associated to the Au@carbynoid NCs from 520 nm to approximately 510 nm, while the central wavelength luminescence of the Cdots, can tuned between 400 and 415 nm. Due to the steric component associated to the carbynoid shell, the NCs present an enhanced stability in water environment with high ionic force (i.e 0.15 mol/L NaCl) if compared to AuNPs synthesized by classical wet chemical routes, and do not present any cytotoxicity for human fibroblasts [3] endothelial cells, and keratinocytes.

While the Au@carbynoid NCs inked with Pluronic-F127 can be used as efficient drug carriers [4] to enhance the photodynamic activity of photosensitizers, the luminescent Cdots can be exploited as chemo-luminescent nanoprobes for the detection of Hg^{2+} ions, showing a better sensitivity and response time than chemically synthesized graphene quantum dots [5].

Biography

I am PhD student in PUC Rio, Brazil and I have been publishing on in reputed journal.

Presenting author details
Full name: TAHIR
Contact number:005521967423621
Twitter account:Nell
Linked In account:
Session name/ number: Nanoparticle synthesis
Category: (Oral presentation)

Bibliography

[1] J-P. Sylvestre, S. Poulin, A.V. Kabashin, E. Sacher, M. Meunier, J. H. T. Luong, Surface Chemistry of Gold Nanoparticles Produced by Laser Ablation in Aqueous Media, J. Phys. Chem. B, **108**, pp. 16864-16869, (2004)

[2] V. Amendola, M. Meneghetti, What controls the composition and the structure of nano-materials generated by laser ablation in liquid solution?, Phys. Chem. Chem. Phys, **15**, pp. 3027-3046, (2013)

[3] A. Giusti, E. Giorgetti, S. Laza, P. Marsili, F. Giammanco, Multiphoton Fragmentation of PAMAM G5-Capped Gold Nanoparticles Induced by Picosecond Laser Irradiation at 532 nm, J. Phys. Chem. C, **111**, pp. 14984-14991, (2007)
[4] T. Del Rosso, S.R.W.Louro, F.L.Deepak, E.C.Romani, Q.Zaman, Tahir, O.Pandoli, M.Cremona, F.L.Freire Junior, P.A.A.De Beule, T.De St. Pierre, R.Q.Aucelio, G.Mariotto, S.Gemini-Piperni, A.R.Ribeiro, S.M.Landi, A.Magalhães, Biocompatible Au@Carbynoid/Pluronic-F127 nanocomposites synthesized by pulsed laser ablation assisted CO_2 recycling, Appl. Surf. Sci., **441**, pp.347-355, (2018)
[5] C. A.Toloza, S. Khan, R. L. D. Silva, E. C. Romani, Jr. F. L. Freire, R. Q. Aucelio, Different approaches for sensing captopril based on functionalized graphene quantum dots as photoluminescent probe, J. Lumin, **179**, pp. 83–92, (2016).