

Accepted Manuscript

Title: Exceptionally stable silver nanoparticles synthesized by laser ablation in alcoholic organic solvent

Authors: Maria C Sportelli, Maurizio Clemente, Margherita Izzi, Annalisa Volpe, Antonio Ancona, Rosaria A. Picca, Gerardo Palazzo, Nicola Cioffi



PII: S0927-7757(18)31123-3
DOI: <https://doi.org/10.1016/j.colsurfa.2018.09.046>
Reference: COLSUA 22846

To appear in: *Colloids and Surfaces A: Physicochem. Eng. Aspects*

Received date: 31-7-2018
Revised date: 14-9-2018
Accepted date: 16-9-2018

Please cite this article as: Sportelli MC, Clemente M, Izzi M, Volpe A, Ancona A, Picca RA, Palazzo G, Cioffi N, Exceptionally stable silver nanoparticles synthesized by laser ablation in alcoholic organic solvent, *Colloids and Surfaces A: Physicochemical and Engineering Aspects* (2018), <https://doi.org/10.1016/j.colsurfa.2018.09.046>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Exceptionally stable silver nanoparticles synthesized by laser ablation in alcoholic organic solvent

Maria C. Sportelli^{a,b}, Maurizio Clemente^{a†}, Margherita Izzi^{a†}, Annalisa Volpe^{b†}, Antonio Ancona^b, Rosaria A. Picca^{a,c}, Gerardo Palazzo^{a,c}, Nicola Cioffi^{a,c*}

^a Chemistry Department, University of Bari “Aldo Moro”, via E. Orabona 4 – 70126 Bari, Italy. maria.sportelli@uniba.it; m.clemente8@studenti.uniba.it; m.izzi@studenti.uniba.it, rosaria.picca@uniba.it, gerardo.palazzo@uniba.it, nicola.cioffi@uniba.it

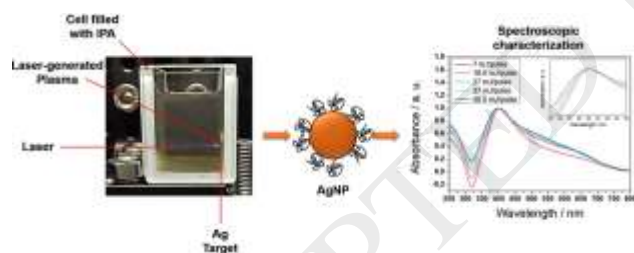
^b IFN-CNR, Physics Department “M. Merlin”, Bari, Italy, via Amendola 173 – 70126 Bari, Italy. annalisa.volpe@ifn.cnr.it; antonio.ancona@uniba.it

^c CSGI (Center for Colloid and Surface Science) c/o Dept. Chemistry, via Orabona 4, 70125 Bari, Italy

*Correspondence: Nicola Cioffi: Tel.: +39 080 544 2020; Fax: +39 080 544 2026; Email: nicola.cioffi@uniba.it;

† These authors contributed equally and are listed in alphabetical order.

Graphical Abstract



Abstract: Silver nanoparticles synthesized using laser ablation synthesis in isopropanol, in absence of additional capping agents, were found to be stable with respect to both aggregation and silver oxidation over several months. The rationale for this extreme stability of metal nanoparticles suspended in organic solvents was challenging. On the basis of theoretical considerations and basic experiments it is proposed that the stabilization of silver nanoparticles involves the formation of an organic coating generated by the interaction of isopropanol molecules with the pulsed, high-energy laser beam. This coating prevents, on the one hand, any chemical reaction on colloidal nanoparticles (e.g. silver oxidation); on the other hand, the presence of the organic shell with a nature akin to that of the organic solvent led to weaker Van der Waals interactions between approaching nanoparticles enabling a larger stability than for naked metallic nanoparticles.

Download English Version:

<https://daneshyari.com/en/article/10226106>

Download Persian Version:

<https://daneshyari.com/article/10226106>

[Daneshyari.com](https://daneshyari.com)