Answers to Reviewer 2

Dear Reviewer,

Thank you very much for your comments and suggestions. The manuscript was now improved, all the changes in the manuscript being made by using the *Track changes* function of MS Word. Please find below our point-to-point answers to your comments.

1. Silver laser ablation and deposition have been extensively studied considering short and ultrashort laser sources. In the introductory section, the existing literature on the subject should be considered and discussed, highlighting the novelty content of this study. In the same section, some references seem to be off-topic (e.g. 1-6).

The Introduction section was extended and the novelty content of this study was highlighted:

"The novelty of the study presented with this work consists in a complex analysis of the phenomena and physico-chemical processes that take place during the pulsed laser deposition of a thin layer of silver with impurities, as well as of those arising from the interaction of the thin layer with complex organic molecules in the sense of the effect catalytic. In the analysis of the ablation plasma plume, the novelty consists in obtaining information on the chemical species developed using mass spectroscopy and the pulsed laser as source of ionization energy of the chemical species."

New references were introduced.

2. The authors report that the ablation plume has a velocity of 6.5*10^3 m/s. However, there is ample evidence that the laser-induced plume contains excited ions and atoms that reflect the composition of the target and emit radiation. The reported plume velocity was calculated considering the overall plasma intensity, but the velocity of different species is more indicative of the plasma dynamics.

This speed is specific to the laser ablation plasma that contains most of the excited species in the plasma. It is true that there are two plasma formations, a fast one which is mainly formed by ions and electrons, with an average speed of 10^4 m/s and a slow one, full of excited atoms, which have average speeds an order of magnitude lower. It is true that under certain experimental conditions, the first plasma formation can suffer a reflection phenomenon on the support of the deposited thin layer, but the experimental conditions are critical at higher working gas pressures and when the target-support distance has smaller values. The reflection mechanisms of the energetic plume can influence the quality of the deposited layer, and, for this reason, such research must be deepened by electrical, optical or mass spectrometry methods. In our studies presented in this article, we have restricted our research to some experimental parameters that do not raise other phenomena that may be of a complex nature. But, yes, the research will be expanded, and we will research other targets, as well as other critical experimental parameters.

3. The optical calibration of the ICCD should be considered. Some experimental parameters such as the gate of the ICCD used to record the global intensity should be reported.

In the revised text, the description was changed to:

“The recorded images were resolved in space and time using a sequential imaging technique with exposure time (integration) and delays varied in the nanosecond range. The camera with CCD intensification (Roper Scientific ICCD 2ns Pi-Max 3 – 1024i camera) has an integration time of 2 ns and a resolution of 1024×1024 pixels. In the experiment, an integration time of 3 ns was chosen, and the images were recorded after the laser pulse, from 100 ns to 1200 ns, for each image 10 acquisitions were made.”

4. The authors should explain how the distribution of RB21 can be argued from the SEM image shown in Fig. 9a. Furthermore, can the authors formulate a hypothesis on the nature of the crystal structure observed in fig. 9b (silver or RB21)?

We added in the text as it follows:

“In Figure 9a, the shape of the droplets can be distinguished, just like in the SEM image of the thin silver film in Figure 7a, but the image is darker and matte because of the organic material that covers the thin silver layer. No brightness differences are observed on the studied surface, compared to the SEM image of the thin silver layer in Figure 7a, where the droplets are brighter than the background.”

“The crystal structure in Figure 9b belongs to the components resulted from reaction between RB21 and $NaHCO_3$ in the aqueous solution poured on the silver thin film.”

5. The etching effect of the RB21 solution needs to be clarified. Can this effect be related to the presence of the dye? What about the thickness of the film after interaction with the NaHCO3 solution?

We added in the revised text, as it follows:

“This etching effect could be caused by entrainment of submicrometer silver particles in the resulting leakage as a result of pouring the aqueous solution of RB21 and NaHCO3 and/or silver particles binding to modified and ionized functional groups such as sulfonate and carboxylate.”

6. Finally, the catalytic action wasn’t proved.

The catalytic effect has been explained now in the revised manuscript.

On behalf of all authors,

Prof. Dan-Gheorghe Dimitriu