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| Book Name: | **Plasmas Afterglows with N2 for Surface Treatments synthesis 2024** |
| Manuscript Number: | **Ms\_BPR\_ 3686.3** |
| Title of the Manuscript: | **Active Species in Plasmas Produced by Microwave Cavities** |
| Type of the Article | **Book chapter** |

PART 1: Review Comments

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| **Compulsory** REVISION comments | **Reviewer’s comment** | **Author’s Feedback** *(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback**here)* |
| **Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimum of 3-4 sentences may be required for this part.** | **This manuscript is significant for the scientific community as it provides valuable insights into the characterization and behavior of microwave plasmas across a wide range of pressures and gas compositions. The detailed analysis of active species, particularly in N₂-Ar systems, contributes to the understanding of plasma kinetics and the production of reactive species critical for applications in materials processing, environmental remediation, and biomedical fields. The study's comprehensive approach, combining optical spectroscopy and thermodynamic characterization, demonstrates scientific rigor and practical relevance. Furthermore, the comparison of different plasma sources and the emphasis on conditions approaching Local Thermodynamic Equilibrium (LTE) add depth to the work, making it a****valuable reference for researchers in plasma science and its interdisciplinary applications.** |  |
| **Is the title of the article suitable?****(If not please suggest an alternative title)** | **The title, "Active Species in Plasmas Produced by Microwave Cavities," is suitable as it clearly reflects the focus of the study on plasma species and their production through microwave cavities.** |  |

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| **Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.** | **The abstract is comprehensive and provides a detailed overview of the study's scope, experimental setup, and findings.** |  |
| **Are subsections and structure of the manuscript appropriate?** | **The structure of the manuscript is logical and appropriate for a book chapter, as it systematically explores different types of microwave plasmas across various pressure regimes and devices. However, some refinements could improve the flow and clarity of the content: The introduction should briefly place the study in a broad context and highlight why it is important. It should define the purpose of the work and its significance. The current state of the research field should be carefully reviewed and key publications cited. There are no citation in the introduction section. References should be numbered in order of appearance and indicated by a numeral or numerals in square brackets—e.g., [1] or [2,3], or [4–6]. Please elaborate the discussion about what other authors have studied and which is the difference between their findings and yours. Sections 3.2 to 3.6 discuss different plasma types and conditions, but they could be grouped under broader headings to improve coherence:****3.2–3.3: Low- and Medium-Pressure Plasma Sources****3.4–3.6: Microwave-Based Plasma Sources at Atmospheric Pressure****If results are integrated into the sections, ensure that the presentation is uniform.** |  |
| **Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimum of 3-4 sentences may be required for this part.** | **This manuscript demonstrates scientific robustness and technical soundness through its comprehensive experimental approach to studying microwave plasmas across a range of pressures and gas compositions. The detailed analysis of various plasma sources, including surface wave (SW) plasmas, UHF plasmas, and microwave torches, provides valuable insights into plasma characteristics such as active species production, electron density, and gas temperature. The use of optical spectroscopy and resonant absorption techniques for detecting and analyzing active species is a well-established, scientifically rigorous method in plasma research. Furthermore, the manuscript’s integration of results from multiple plasma sources under varying experimental conditions adds depth to the understanding of plasma kinetics****and interactions, making it a valuable contribution to the field of plasma science.** |  |
| **Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.****-** | **The references provided cover a broad range of foundational and more recent works in the field of microwave plasmas. Most of the references in the list provided are quite old, many dating from the 1970s and 1980s. Although these seminal works are essential for understanding the initial development of****microwave plasma and associated technologies, to ensure the relevance and timeliness of the work, it would be advisable to include more recent references.** |  |
| Minor REVISION comments**Is the language/English quality of the article suitable for scholarly communications?** | **The language and English quality of the paper appears to be generally suitable for scholarly communication, but there are a few areas where improvements could be made to enhance clarity, precision, and readability** |  |
| **PART 2:**  |
|  | **Reviewer’s comment** | **Author’s comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)* |
| **Are there ethical issues in this manuscript?**  | *(If yes, Kindly please write down the ethical issues here in details)* |  |

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| **Reviewer Details:** |
| Name: | **Mihaela Constantin** |
| Department, University & Country | **National University of Science and Technology „POLITEHNICA” of Bucharest, Romania** |