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| Book Name: | **Plasmas Afterglows with N2 for Surface Treatments synthesis 2024** |
| Manuscript Number: | **Ms\_BPR\_3686.20** |
| Title of the Manuscript: | **N and C-atoms in R (Ar)-N2-CH4 Flowing Afterglows at High Pressure** |
| Type of the Article | **Book chapter** |

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| PART 1: Review Comments | | |
| 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 important for the scientific community as it offers valuable insights into the production and behavior of N-atom densities in high-pressure flowing afterglows, which are crucial for understanding plasma dynamics in industrial and research applications. The study's exploration of plasma characteristics across a wide frequency range and the impact of gas mixtures, including argon and methane, provides a deeper understanding of plasma chemistry and recombination processes. I appreciate the manuscript for its detailed experimental approach and its ability to connect fundamental plasma behavior with practical implications, such as the effects of gas composition on atom densities and reactions. However, the manuscript could be strengthened by a more in-depth discussion of the broader applications of these findings, particularly in areas like materials processing or environmental engineering. |  |
| **Is the title of the article suitable?**  **(If not please suggest an alternative title)** | **Yes** |  |
| 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. | **Yes** |  |
| **Are subsections and structure of the manuscript appropriate?** | **Yes** |  |
| **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 is scientifically robust and technically sound due to its comprehensive experimental approach and thorough analysis of plasma behavior in high-pressure flowing afterglows. The authors employ well-established diagnostic techniques to measure N-atom densities and recombination coefficients, ensuring the reliability of the results. The study accurately accounts for the effects of varying gas compositions and plasma frequencies, with clear identification of the relationships between plasma length, gas mixture, and atomic densities. Additionally, the observed changes in recombination coefficients and the detailed measurements of CH3 and C-atom densities provide a solid understanding of the underlying plasma chemistry. Overall, the manuscript presents a clear and methodologically sound analysis, reinforcing its scientific correctness. |  |
| **Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.**  **-** | **Yes, can add 3 to 5 more references** |  |
| Minor REVISION commentsIs the language/English quality of the article suitable for scholarly communications? | Yes |  |
| Optional/General comments | This manuscript provides valuable experimental data on N-atom and C-atom densities in high-pressure Ar-N2 flowing afterglows, with a focus on the effects of gas mixtures and plasma frequency. The study is well-structured and offers important insights into plasma chemistry, though further discussion of potential applications in industrial processes could enhance its impact. |  |

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| **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:** | **Anitha Rexalin Devaraj** |
| **Department, University & Country** | **AMET Deemed to be University, India** |