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| Book Name: | **Plasmas Afterglows with N2 for Surface Treatments synthesis 2024** |
| Manuscript Number: | **Ms\_BPR\_3686.7** |
| Title of the Manuscript:  | **Plasma Sources for a High Flux of Active Species** |
| 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 minimumof 3-4 sentences may be required for this part.** | The article makes a valuable contribution to plasma physics and its applications. With improvements in clarity, comparative analysis, and contextual framing, the paper will provide even greater impact and utility to the scientific community.****Strengths of the Article****1. **Comprehensive Scope**: The article presents a detailed exploration of plasma sources and the production of metastable atoms, providing valuable insights into various discharge methods like DC glow, hollow cathode arcs, and microwave surfatron discharges.
2. **Diverse Methodologies**: The use of multiple measurement techniques, such as NO titration, resonant absorption spectroscopy, and catalytic probes, enhances the reliability of the results and demonstrates a rigorous experimental approach.
3. **Application Relevance**: The findings, particularly on metastable atom densities and dissociation fractions, are highly applicable in plasma chemistry, surface treatments, and other technological applications.
4. **Data Presentation**: The inclusion of figures and tables to visualize experimental setups and trends aids in understanding the results and provides a clear representation of the findings.

****Areas for Improvement****1. **Clarity in Objectives**: While the article is comprehensive, the specific aims of the research could be stated more explicitly in the introduction.
2. **Comparison of Results**: A more in-depth comparison with previous studies would better highlight the advancements and contributions of the work.
3. **Simplification for Accessibility**: Some sections are dense with technical jargon, which might limit accessibility to a broader audience. Simplifying language in parts and providing brief explanations of specialized terms would be beneficial.
4. **Enhanced Analysis**: The discussion could benefit from deeper insights into the implications of the findings for real-world applications or theoretical advancements.
5. **Consistency in Formatting**: Ensure consistent use of terminology, symbols, and units throughout the text for a more polished presentation.
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| **Is the title of the article suitable?****(If not please suggest an alternative title)** | The title of the article, **"Plasma Sources for a High Flux of Active Species,"** is somewhat descriptive of the content but could be refined to better capture the essence of the study. The article covers the production, characterization, and dynamics of metastable atoms and reactive species in various plasma discharge methods.Here are some suggestions for a more precise and engaging title:1. **"High-Density Production of Metastable and Reactive Species in DC Glow, HCA, and Microwave Plasmas"**
2. **"Exploring Plasma Sources for Optimized Production of Metastable Atoms and Reactive Species"**
3. **"Metastable and Reactive Species Dynamics in Glow, Arc, and Microwave Plasmas"**
4. **"Advancing Plasma Chemistry: High-Flux Production of Metastable and Reactive Atoms"**
5. **"Characterization of Metastable and Reactive Species in Various Plasma Discharge Systems"**
6. **"From Glow to Surfatrons: Plasma Discharges for High-Density Active Species"**
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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. | Revised Abstract (Example):Flowing plasmas and afterglows sustained by DC glow, hollow cathode arc (HCA), and microwave (surfatron) discharges were studied to optimize the production of metastable rare gas atoms (He, Ne, Ar) and reactive species (N, O, H). By varying experimental parameters such as pressure, discharge power, and gas composition, maximum densities of 10¹¹-10¹² cm⁻³ for metastables and 10¹⁵-10¹⁶ cm⁻³ for reactive atoms were achieved. Absolute densities were measured using complementary techniques, including resonant absorption spectroscopy, NO titration, and catalytic probes, ensuring accurate characterization. These results provide critical insights for advancing plasma-based technologies, particularly in plasma chemistry and surface modification applications. |  |
| **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 minimumof 3-4 sentences may be required for this part.** | This manuscript is scientifically robust and technically sound due to its comprehensive approach in investigating the production and characterization of metastable atoms and reactive species across multiple plasma discharge systems. The authors employ a diverse set of validated measurement techniques, such as resonant absorption spectroscopy, NO titration, and catalytic probes, ensuring the reliability and accuracy of the results. Furthermore, the study demonstrates a clear understanding of the underlying physics by providing detailed explanations of the mechanisms governing the production and loss of active species. The inclusion of comparative analyses and data trends across different plasma sources adds depth, making the findings valuable for both scientific research and technological applications. |  |
| **Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.****-** | **yes** |  |
| Minor REVISION commentsIs the language/English quality of the article suitable for scholarly communications? | yes |  |
| Optional/Generalcomments | **Specific Suggestions**1. **Introduction**: Include a summary of the key challenges in the field and how the study addresses them to frame the research context better.
2. **Methodology**: Expand on the limitations of the employed techniques and discuss how they were mitigated during the experiments.
3. **Results and Discussion**: Provide more comparative analysis between the different plasma sources and their efficiencies under similar conditions.
4. **References**: Add recent studies to ensure the work is well-grounded in the current state of research.

**Overall Assessment**The article makes a valuable contribution to plasma physics and its applications. With improvements in clarity, comparative analysis, and contextual framing, the paper will provide even greater impact and utility to the scientific community. |  |

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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: | **Saba Zafar** |
| Department, University & Country | **Pakistan** |