Title goes here: a capital letter should be used only at the beginning of the first word, and for proper nouns, scientific and trade names, and chemical symbols

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Abstract concisely states the objectives and scope of research, and summarizes the results and principal conclusion gained in your research work. A well-written abstract, together with the title, enables potential readers to determine whether your paper is interesting and worth reading in full. Abstracts must be concise, generally presented as one paragraph, and the length should not exceed 150 words for JJAP regular papers. It should not contain display equations. It is not part of the text and should be complete in itself: no tables, figures, or references should be cited. It must be a single paragraph.

1. Introduction

The introduction is a critical part of your paper because it introduces the reasons behind your paper’s existence.1-4) It must state the objectives and scope of your work, present what problem or question you address, and describe why this is an interesting or important challenge. It is important to introduce appropriate and sufficient references to prior works so that readers can understand the context and background of the research and the specific reason for your research work. Having explored those, the objectives and scope of your work must be clearly stated. The introduction may explain the approach that is characteristic to your work, and mention the essence of the conclusion of the paper.5)

**2. Experimental methods**

The Methods section provides sufficient detail of theoretical and experimental methods and materials used in your research work so that any reader would be able to repeat your research work and reproduce the results. Be precise, complete and concise: include only relevant information. For example, provide a reference for a particular technique instead of describing all the details.6-8)

If you need to use equations, especially display equations, they should be prepared using the Equation Editor if possible.

(1)

**3. Results and discussion**

3.1 Results

The Results subsection presents the facts, findings of the study, by effectively using figures and tables. This section must present the results clearly and logically to highlight potential implications. Combine the use of text, tables, and figures to digest and condense the data, and highlight important trends and extract relationships among different data items. Figures must be well designed, clear, and easy to read. Figure captions should be succinct yet provide sufficient information to understand the figures without reference to the text.

3.2 Discussion

In the Discussion subsection, present your interpretation and conclusions gained from your findings. You can discuss how your findings compare with other experimental observations or theoretical expectations. Refer to your characteristic results described in the Results section to support your discussion, since your interpretation and conclusion must be based on evidence. By properly structuring this discussion, you can show how your results can solve the current problems and how they relate to the research objectives that you have described in the Introduction section. This is your chance to clearly demonstrate the novelty and importance of your research work.

**4. Conclusions**

The Conclusion section **summarizes the important results and impact of the research work. Future work plans may be included if they are beneficial to readers.**

**Acknowledgments**

The Acknowledgments section is to recognize financial support from funding bodies and scientific and technical contributions that you have received during your research work.

Appendix

If necessary, Appendixes can be written after the acknowledgment. If there are two or more appendixes, they should be labeled Appendix A, Appendix B, etc.

**References**

1. R. Suzuki, K. Beni, P. M. Crozier, and T. Miyanaga, Jpn. J. Appl. Phys. **53**, 011001 (2014).
2. S. M. Sze, *Physics of Semiconductor Devices* (Wiley, New York, 1981) 2nd ed., p. 55.
3. A. Nakazaki, J. Maruyama, T. Kayumi, H. Hamachi, J. Moritani, and S. Hine, Proc. Int. Symp. Power Semiconductor Devices and ICs, 2000, p.370.
4. T. Takenouchi, *Handotai* (Semiconductors) (Shokabo, Tokyo, 1964) p.83 [in Japanese].
5. Each reference number should correspond to only one reference. Different papers by the same authors should be listed separately in the reference list under different numbers (excluding errata).
6. The term “ibid.” should not be used even if the same journal or book is cited with different page numbers.
7. The term “et al.” should not be used in the references. List all the authors (with the exception of software references with a very large number of authors, for which et al. may be used).
8. Footnotes can be made only for author's present addresses. Any comments or remarks should be listed in references.

**Figure Captions**

**Fig. 1.** Figures must be complete so that no editing will be required. The list of figure captions should be provided after the reference list.

**Fig. 2.** The APEX/JJAP Editorial Board has decided to discontinue the color printing in the printed version in issue 1 of 2019 onward. All figures except for black/white will be published online in color. The note “Color online” in figure captions will not be provided. Printed reprints, if ordered, will be printed in color.

**Table I.** The following expressions should be used.

|  |  |
| --- | --- |
| At the beginning of a sentence | Within a sentence |
| Section 1 | Sect. 1 |
| Section 2 and 3 | Sects. 2 and 3 |
|  |  |
| Equation (1) | Eq. (1) |
| Equations (2) and (3) | Eqs. (2) and (3) |
| Equations (4) – (10) | Eqs. (4) – (10) |
|  |  |
| Table I | Table I |
| Tables I and II | Tables I and II |
| Tables II– VI | Tables II– VI |
|  |  |
| Figure 1 | Fig. 1 |
| Figures 1(a) and 1(b) | Figs. 1(a) and 1(b) |
| Figures 2–5 | Figs. 2–5 |
|  |  |
| Reference 1 | Ref. 1 |
| References 1 and 2 | Refs. 1 and 2 |
| References 3–5 | Refs. 3–5 |

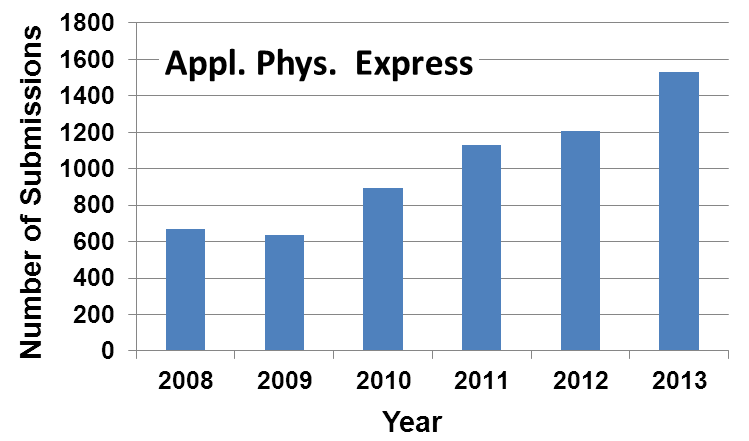


Fig.1.



1. (b)

Fig. 2.