# Article information:

Comprehensive Analysis of Data-Retention and Endurance Trade-Off of 40nm TaOx-based ReRAM | IEEE Conference Publication | IEEE Xplore  
<https://ieeexplore.ieee.org/document/8720436>

# Article summary:

1. This article presents multiple write techniques to improve the reliability of 40nm TaOx-based resistive random access memory (ReRAM).

2. The paper investigates the optimal combination of these techniques for long-term data-retention, resulting in an increase in data-retention lifetime by 413x at low endurance cycles and 84x at high endurance cycles.

3. A physical model based on oxygen vacancy (Vo) diffusion is discussed to explain such lifetime enhancement, as well as an effective data modulation technique to suppress endurance-stress by using Asymmetric Coding (AC).

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

This article provides a comprehensive analysis of the trade-off between data retention and endurance for 40nm TaOx-based ReRAM. The authors present various write techniques such as “Verify”, “Finalize\_Verify” and “Relaxation effect” to achieve both endurance and lifetime. They also propose a physical model based on oxygen vacancy (Vo) diffusion to explain the lifetime enhancement, as well as an effective data modulation technique to suppress endurance-stress by using Asymmetric Coding (AC).

The article appears to be reliable and trustworthy overall. It is written in a clear and concise manner, with sufficient evidence provided for its claims. The authors have presented both sides of the argument equally, providing counterarguments where necessary. Furthermore, they have noted potential risks associated with their proposed techniques and methods. There does not appear to be any promotional content or partiality in the article.

However, there are some points that could be improved upon. For example, while the authors provide evidence for their claims, they do not explore all possible counterarguments or consider other points of view that may exist on this topic. Additionally, there is no discussion of how their proposed techniques may affect other aspects of ReRAM performance such as power consumption or speed. These issues should be addressed in future research on this topic.

# Topics for further research:

* ReRAM power consumption
* ReRAM speed optimization
* Oxygen vacancy diffusion
* Asymmetric Coding techniques
* Data retention trade-off
* ReRAM endurance stress

# Report location:

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