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New horizons of nanoionics-based devices

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Recent progress in nanoionics is now opening new horizons in both nanoelectronic device technology and fundamental materials science. In this paper, we review the following four aspects of the recent developments of nanoionics by choosing the present authors' work related to the atomic switch as main examples.

- A) Practical application[1] of the atomic switch.[2]
- B) Synapse-like characteristics[3-6] exhibited by the atomic switch.
- C) Interesting properties of a network of a huge number of atomic switches.[7-9]
- D) Local electron doping into an insulator by using nanoelectroionic processes.[10-14]

References

- [1] See: http://www.nec.com/en/press/201509/global_20150907_04.html
- [2] See the following three papers as selected early work of the atomic switch: K. Terabe et al., RIKEN Review No. 37 (2001) 7; K. Terabe et al., Nature 433 (2005) 47; T. Sakamoto et al., Appl. Phys. Lett. 82 (2003) 3032.
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