

Toward Future Nanoscale Biomolecular Computing using Integrated Circuits

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Keywords

Life, health and medical informatics-related (62010),
Computational science-related (60100)

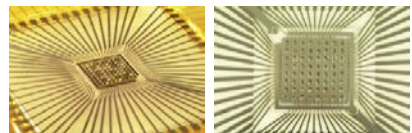
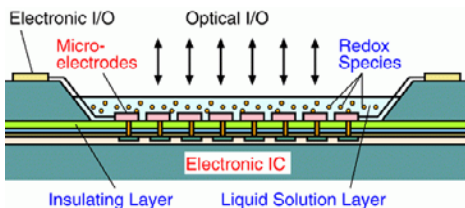


Research Topics

- Biomolecular computing and bioelectronics
- New computing paradigms

Research Seeds

We explore the possibility of constructing high-density parallel computing architectures using molecular electronics technology. New circuit and system integration modes can be realized using molecular computing devices. To clarify the proposed concept, an experimental model of a redox microarray is presented. A first experimental system for a redox microarray consists of a two-dimensional array of platinum microelectrodes to catalyze reversible reactions of redox-active molecules. Experimental results related to active wave propagation in the redox microarray are presented to demonstrate the potential of molecular computing devices for specific target applications.



Redox microarray: an experimental prototype of a molecular computing integrated circuit.

Electrochemical implementation of molecular computing integrated circuits.

• References

- [1] M. Hiratsuka et al., International Journal of Nanotechnology and Molecular Computation, Vol. 1, No. 3, pp. 17–25, July 2009.
- [2] M. Hiratsuka et al., International Journal of Unconventional Computing, Vol. 4, No. 2, pp. 113–123, 2008.
- [3] M. Hiratsuka et al., IEE Proceedings – Nanobiotechnology, Vol. 150, No. 1, pp. 9–14, June 2003.

Related Technology

- Computer science
- Nanobiotechnology