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Special Focus on Advanced Microelectronics Technology

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Editor's note

Over the past 50 years, the microelectronics technology has recognized rapid development, resulting in a successful Si-based integrated circuit (IC) industry, with killer applications such as personal computers, mobile communication, and recently, smart phones. The conventional digital IC technologies driven by classic "device scaling" have met the "brick wall" of performance and power when entering the sub-100 nm region, which resulted in a strong boost to the "equivalent scaling" with new materials (e.g., high-k and SiGe) and device structures (e.g., FinFET, FDSOI, and GAA NWFET), also known as "More Moore" strategy, i.e., further pushing the famous Moore's law[1)]. Meanwhile, microelectronics technology and IC industry have been spread to "More than Moore", which expands the scope of IC applications by integrating non-digital functionalities into traditional CMOS micro-systems, accompanying 3D integration for "system scaling" and "beyond CMOS" for new device concepts, thus enabling the deployment of innovative product solutions required by modern information world. This new approach has been strongly confirmed by the International Technology Roadmap for Semiconductors (ITRS) since its latest 2015 version, which is regarded as ITRS 2.0[2)]. As will be seen, based on the achievements of "More Moore", the "More than Moore" technologies will highly impact the information technology and human society in the near future. Recognizing this extraordinary progress in microelectronics, the editorial board of *SCIENCE CHINA Information Sciences* was highly motivated to publish special issues to highlight the current development status and future trends in this exciting field. The first special issue, on both "More Moore" and "More than Moore", was successfully published in 2011, with high-profile invited papers[3)]. Now, here comes the second issue, which focuses on new development and extension of microelectronics technology, more or less, from "More than Moore" perspectives.

This special issue contains 6 invited papers, contributed by leading researchers and renowned experts from all over the world:

1) Looking into the future of nanoelectronics in the diversification efficient era;
2) Fully depleted SOI (FDSOI) technology;
3) 3D resistive RAM for high-density storage class memory—a review;
4) Synaptic electronics and neuromorphic computing;
5) Development of two-dimensional materials for electronic applications;
6) Design for manufacturability and reliability in extreme-scaling VLSI.

We would like to thank all the authors for their great contributions, and our reviewers for their efforts in such tight schedule.

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1) G. E. Moore, Electronics 38, 114-117 (1965). G. E. Moore, IEDM Tech Dig, 11–13 (1975).
2) http://www.itrs2.net/
3) Huang R, Zhao B, ed. Special Issue on Advanced Microelectronics Technologies. Sci China Inf Sci, 2011, 54(5): 913–1102.

