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Recent Advances in Memory Materials and Devices

Guest Editor:

Dr. Keyuan Ding

College of Materials Science and Engineering, Shenzhen University, Shenzhen 518055, China

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Message from the Guest Editor

Dear Colleagues,

Significant progress has been made in semiconductor memory, especially phase-change memory (PCM) based on heterostructure and superlattice structure materials, which have attracted considerable attention due to their excellent performance. Phase-change heterostructure (PCH) can overcome the low-precision bottleneck that limits multibit storage and parallel computing in conventional PCM, offering novel physical and chemical properties for semiconductor memory devices.

The development of a new heterostructure for PCM and ovonic threshold switch (OTS) is necessary for their emerging practical device applications. For instance, Sb₂Te₃/TiTe₂, the multilayer PCH architecture was designed for two-dimensional (2D) phase transitions in nanometer-thick Sb₂Te₃ phase-change material sublayers that are clamped by confinement TiTe₂ sublayers, enabling well-controlled cumulative/progressive SET (crystallization) and iterative/stepwise RESET (amorphization) operations.

We invite contributions of research articles and review on topics including but not limited to the theoretical calculation, synthesis, characterization, and application of novel heterostructures for PCM or OTS.







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Editor-in-Chief

Prof. Dr. Ai-Qun Liu

 Department of Electrical and Electronic Engineering, The Hong Kong Polytechnic University, Hong Kong, China
School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore 639798, Singapore

Message from the Editor-in-Chief

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Micromachines Editorial Office MDPI, Grosspeteranlage 5 4052 Basel, Switzerland Tel: +41 61 683 77 34 www.mdpi.com mdpi.com/journal/micromachines micromachines@mdpi.com X@micromach_mdpi