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J Materiomics Vol 1, 2015

Graphical Abstracts

Review Articles

J Materiomics ***2015***, 1, **263–284**

Multiferroic heterostructures and tunneling junctions

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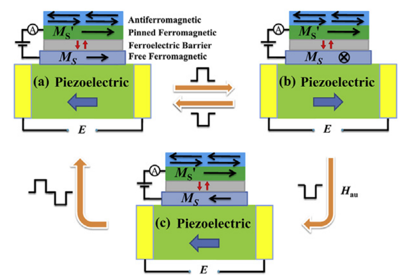
We review the recent advances as well as the potential applications of strain- and charge-mediated magnetoelectric coupling effects on the magnetic and electronic transport properties in multiferroic heterostructures and multiferroic tunnel junctions.



J Materiomics ***2015***, 1, **285–295**

An overview of materials issues in resistive random access memory

Linggang Zhu[a,b], Jian Zhou[a], Zhonglu Guo[b], Zhimei Sun[a,b,*]

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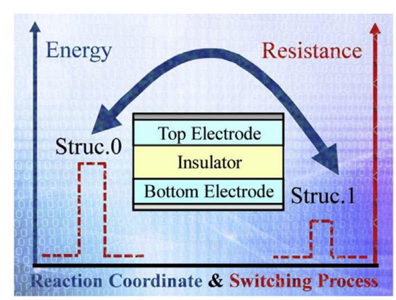
Some general rules of material selection for resistive random access memory (RRAM) are proposed. Mechanisms of resistance switch in RRAM are reviewed. Computational material science will play an important role in the design of RRAM.



J Materiomics ***2015***, 1, **296−306**

Helices in micro-world: Materials, properties, and applications

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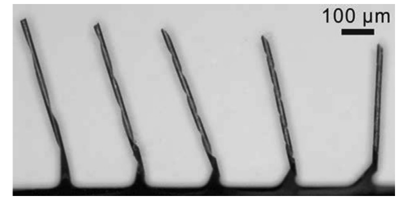

This overview reviews recent progresses in micro-helices related researches. The micro-helices can be produced by numerous approaches, either “top-down” or “bottom-up”. Micro-helices have unique properties in mechanics, electrics, magnetics, optics, etc. Micro-helices have great potential in micro-electro-mechanical system and lab-on-a-chip.

Original Articles

J Materiomics ***2015***, 1, **307−315**

Band and scattering tuning for high performance thermoelectric $Sn_{1-x}Mn_xTe$ alloys

Wen Li[a], Zhiwei Chen[a], Siqi Lin[a], Yunjie Chang[b], Binghui Ge[b], Yue Chen[c], Yanzhong Pei[a,*]

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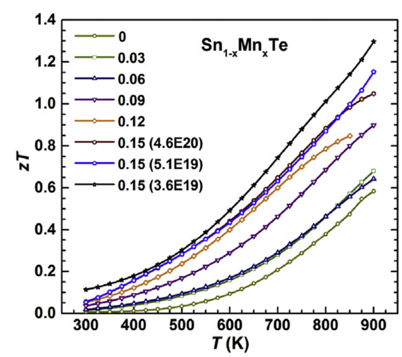

According to our previous experiences on successful manipulation of band structure by alloying, this work is motivated by a heavily alloying strategy for aligning the bands from the well-separated ones in pristine SnTe. The resulting well-aligned conducting channels (bands) for charge carriers and high-concentration blocking centers for heat carriers (phonons) propagation, lead to a record thermoelectric figure of merit, $zT = 1.3$ in SnTe alloys. Most importantly, the obtained high performance does not rely on any other independent strategies than alloying for even lower thermal conductivity, enabling a bright future for a further improvement.

J Materiomics ***2015***, 1, **316−324**

Gas induced reduction synthesis of Sb_2Te_3 and $Bi_{0.5}Sb_{1.5}Te_3$ nanosheets and their evolvement mechanism

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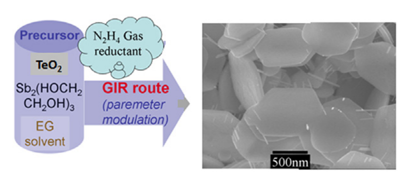

Binary Sb_2Te_3 and ternary $Bi_{0.5}Sb_{1.5}Te_5$ hexagonal nanopellets were synthesized. The nanosheets were synthesized by a gas-induced reduction method. The formation mechanism of the nanopellets was proposed.