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Phase transition of the Ge-Sb-Te(GST) ternary alloy system for the phase-change memory JAE-HYEON EOM, JINO IM, School of Physics and Astronomy, Seoul National University, JIN-WOO JUNG, YOUNG-GUI YOON, Department of Physics, Chung-Ang University, KI-MIN PARK, JISOON IHM, School of Physics and Astronomy, Seoul National University — A theoretical investigation on the phase transition from the crystalline to the amorphous phase of the Ge-Sb-Te(GST) ternary alloy system for the phase-change memory is presented. The local structure of the amorphous phase of the GST is shown to be composed of the stibnite-like structure for the Sb_2Te_3 and chain-like structure for the GeTe by examining the coordination number for $(GeTe)_n(Sb_2Te_3)_m$ homologous series. The phase transition occurs by the change of the arrangement and connection between the building blocks while the structure of the building blocks is preserved. Energy barriers, transition states and the change of the electronic states during the phase transition are obtained using ab initio electronic structure calculations.

Jae-Hyeon Eom
School of Physics and Astronomy, Seoul National University

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