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## The influence of Sb/Te ratio on the crystallization dynamic of GeSbTe alloys

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Phase-Change Memory (PCM) has proven to meet the demands of completely different applications in terms of specifications, such as Storage Class and automotive market. This was possible in particular thanks to the engineering of the stoichiometry of GeSbTe materials. The alloys based on a stoichiometry close to the GeTe-Sb<sub>2</sub>Te<sub>3</sub> tie-line show a “nucleation-dominated” behavior with multiple phase-crystallization steps, while alloys enriched in Sb content show a single-phase “growth-dominated” crystallization [1].

In this study, we investigate the transition from the amorphous to crystalline state in several compositions based on Ge, Sb, and Te, varying the Sb/Te ratio from lower to higher than one. We conducted our experiment by performing Raman spectroscopy, X-ray diffraction (XRD) and resistivity measurements as a function of the temperature. We provide for the first time at our knowledge, some insights into the vibrational states evolution dependency on Sb/Te ratio in GeSbTe system. We support our results with the measurements of the lattice parameters of the crystalline structures and with ab-initio simulations. Based on our results, we support the key role of Sb/Te ratio into the crystallization dynamic of GeSbTe system.

[1] G. D'Arrigo et al., J.MSSP, v.65, 100-107, 2017