

## Evidence of SnSb<sub>2</sub>Te<sub>4</sub> rocksalt metastable phase of thin films grown by pulsed laser deposition

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SnSb<sub>2</sub>Te<sub>4</sub>, an intermetallic compounds in the pseudobinary SnTe-Sb<sub>2</sub>Te<sub>3</sub>, looks as a promising candidate for phase-change material in non-volatile memories applications. Thin films having thickness from 50 to 150 nm were grown by pulsed laser deposition using SnSb<sub>2</sub>Te<sub>4</sub> as structure of 21 *R*-type structure (*R-3m*) consisting of rocksalt-type blocks separated by van der Waals gaps [1], while in thermal equilibrium this phase crystallizes into a complex cubic close-packed structure with gaps [1], the thin films obtained had a simple NaCl-structure (*Fm-3m*) (metastable phase) as it was deduced from conventional XRD measurements in grazing incidence of the investigated films. The metastable phase transitioned to the stable complex structure during the measurements of electrical resistance on temperature dependence. <sup>119m</sup>Sn conversion electron Mössbauer spectroscopy was used to investigate the local environment of Sn atoms in as made film. The existence of Sn(II) in a high symmetry site was found as expected for SnSb<sub>2</sub>Te<sub>4</sub>. Nevertheless, the dominant contribution was Sn(IV) attributed to SnO<sub>2</sub> phase, evidencing an oxidation of the films surface.

The evidence of the metastable NaCl-structure of GeSb<sub>2</sub>Te<sub>4</sub> films induced by heating the amorphous film by laser irradiation were reported [2-4]. Nevertheless, reports about SnSb<sub>2</sub>Te<sub>4</sub> film to date were not found.

**Keywords:** crystal structure, thin films, metastable phase

### References

- [1] O.Oeckler, M.N.Scheider, F.Fahrnbauer, G.Vaughan, *Solid State Sciences* 13 (2011) 1157
- [2] G.Fuxi, X. Songsheng, and F. Zhengxiu, *Annalen der Physik* 1 (1992) 391-398
- [3] T.Matsunaga and N.Yamada, *Physical Review B*, 69 (2004) 104111
- [4] J.Tomforde, W. Bensch, L.Kienle, Ph.Merkelbach and M. Wuttig, *Chemistry of Materials* 23 (2011) 3871

## Thin films of porphyrin-chalcogenide nanocomposite for methane sensing at room temperature

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