

REFERENCES

- Adjadj, F., Belbacha, E.-d., Bouharkat, M. and Kerboub, A. (2006). Crystallographic study of the intermediate compounds SbZn, Sb₃Zn₄ and Sb₂Zn₃. *Journal of Alloys and Compounds*. 419(1–2), 267–270.
- Ahn, J., Oh, M., Kim, B., Park, S., Min, B., Lee, H. and Shim, Y. (2011). Thermoelectric properties of Zn₄Sb₃ prepared by hot pressing. *Materials Research Bulletin*. 46(9), 1490–1495.
- Ang, A. K. R., Yamazaki, I., Hirata, K., Singh, S., Matsunami, M. and Takeuchi, T. (2023). Development of Cu₂Se/Ag₂ (S, Se)–based monolithic thermoelectric generators for low-grade waste heat energy harvesting. *ACS Applied Materials & Interfaces*. 15(40), 46962–46970.
- Asfandiyar, Wei, T.-R., Li, Z., Sun, F.-H., Pan, Y., Wu, C.-F., Farooq, M. U., Tang, H., Li, F. and Li, B. (2017). Thermoelectric SnS and SnS–SnSe solid solutions prepared by mechanical alloying and spark plasma sintering: anisotropic thermoelectric properties. *Scientific reports*. 7(1), 43262.
- Beer, A. and Cochran, K. (1952) Chapter XIII semiconducting compounds : in digest of literature on dielectrics. *IEEE* (16), 136–152.
- Biswas, K., He, J., Blum, I. D., Wu, C.-I., Hogan, T. P., Seidman, D. N., Dravid, V. P. and Kanatzidis, M. G. (2012). High-performance bulk thermoelectrics with all-scale hierarchical architectures. *Nature*. 489(7416): 414–418.
- Bokii, G. and Klevtsova, R. (1965). X-ray structure investigation of the β -phase in the zinc—antimony system. *Journal of Structural Chemistry*. 6(6), 830–834.
- Bokov, D., Turki Jalil, A., Chupradit, S., Suksatan, W., Javed Ansari, M., Shewael, I. H., Valiev, G. H. and Kianfar, E. (2021). Nanomaterial by sol–gel method: synthesis and application. *Advances in Materials Science and Engineering*. 1–21.
- Borup, M. A., Blichfeld, A. B., Madsen, S. R. and Iversen, B. B. (2016). High-pressure single crystal X-ray diffraction study of thermoelectric ZnSb and β -Zn₄Sb₃. *Dalton Transactions*. 45(38), 15097–15103.
- Böttger, P. M., Diplas, S., Flage–Larsen, E., Prytz, Ø. and Finstad, T. G. (2011). Electronic structure of thermoelectric Zn–Sb. *Journal of Physics: Condensed Matter*. 23(26), 265502.

- Caillat, T., Fleurial, J.-P. and Borshchevsky, A. (1997). Preparation and thermoelectric properties of semiconducting Zn_4Sb_3 . *Journal of Physics and Chemistry of Solids*. 58(7), 1119–1125.
- Chen, G. (2005). Nanoscale energy transport and conversion: a parallel treatment of electrons, molecules, phonons, and photons. *Oxford university press*.
- Crawford, C. (2014). Transverse thermoelectric effect.
- Dreßler, C., Bochmann, A., Schulz, T., Reimann, T., Töpfer, J. and Teichert, S. (2015). Transversal oxide–metal thermoelectric device for low-power energy harvesting. *Energy Harvesting and Systems*. 2(1), 25–35.
- Funahashi, S., Nakamura, T., Kageyama, K. and Ieki, H. (2011). Monolithic oxide–metal composite thermoelectric generators for energy harvesting. *Journal of Applied Physics*. 109(12).
- Gainza, J., Serrano–Sanchez, F., Rodrigues, J. E., Huttel, Y., Dura, O. J., Koza, M. M., Fernández–Díaz, M. T., Melendez, J. J., Markus, B. G. and Simon, F. (2020). High–performance n-type SnSe thermoelectric polycrystal prepared by arc–melting. *Cell Reports Physical Science*. 1(12).
- Gharsallah, M., Serrano–Sánchez, F., Bermúdez, J., Nemes, N., Martínez, J., Elhalouani, F. and Alonso, J. (2016). Nanostructured Bi_2Te_3 prepared by a straightforward arc–melting method. *Nanoscale Research Letters*. (11), 1–7.
- Goldsmid, H. (2017). Transverse thermoelectric effects and their application. *Materials, Preparation, and Characterization in Thermoelectrics*. 1–12.
- Goldsmid, H. J. (2010). Introduction to thermoelectricity. *Springer*.
- Hasan, M. N., Muthalif, A. G. A., Saleh, T., Zhang, Z. B. and Ali, M. S. M. (2024). Monolithic carbon nanotube film thermoelectric generator. *IEEE Transactions on Electron Devices*. 71(2), 1179–1184.
- Hsu, K. F., Loo, S., Guo, F., Chen, W., Dyck, J. S., Uher, C., Hogan, T., Polychroniadis, E. and Kanatzidis, M. G. (2004). Cubic $AgPb m\ SbTe^{2+} m$: bulk thermoelectric materials with high figure of merit. *Science*. 303(5659), 818–821.
- Ito, K., Zhang, L., Adachi, K. and Yamaguchi, M. (2003). Low thermal conductivity and related thermoelectric properties of Zn_4Sb_3 and $CoSb_3$ thin films. *MRS Online Proceedings Library (OPL)*. 793.

- Jantrasee, S., Moontragoon, P. and Pinitsoontorn, S. (2016). Thermoelectric properties of Al-doped ZnO: experiment and simulation. *Journal of Semiconductors*. 37(9), 092002.
- Jood, P., Mehta, R. J., Zhang, Y., Peleckis, G., Wang, X., Siegel, R. W., Borca-Tasciuc, T., Dou, S. X. and Ramanath, G. (2011). Al-doped zinc oxide nanocomposites with enhanced thermoelectric properties. *Nano letters*. 11(10), 4337–4342.
- Kumar, A., Singh, A. and Suhane, A. (2022). Mechanically alloyed high entropy alloys: existing challenges and opportunities. *Journal of Materials Research and Technology*. 17, 2431–2456.
- Kunioka, H., Obara, H., Yamamoto, A. and Iida, T. (2018). Observation of interface between thermoelectric material Zn_4Sb_3 and electrodes by resistance scanning and Seebeck coefficient mapping techniques. *Materials Transactions*. 59(7), 1035–1040.
- Lai, H., Singh, S., Peng, Y., Hirata, K., Ryu, M., Ang, A. K. R., Miao, L. and Takeuchi, T. (2022). Enhanced performance of monolithic chalcogenide thermoelectric modules for energy harvesting via co-optimization of experiment and simulation. *ACS Applied Materials & Interfaces*. 14(34), 38642–38650.
- Lan, J.-L., Liu, Y., Lin, Y.-H., Nan, C.-W., Cai, Q. and Yang, X. (2015). Enhanced thermoelectric performance of In_2O_3 -based ceramics via nanostructuring and point defect engineering. *Scientific Reports*. 5(1), 7783.
- Lee, P.-Y. and Lin, P.-H. (2018). Evolution of thermoelectric properties of Zn_4Sb_3 prepared by mechanical alloying and different consolidation routes. *Energies*. 11(5), 1200.
- Levin, E., Bud'Ko, S. and Schmidt-Rohr, K. (2012). Enhancement of thermopower of TAGS-85 high-performance thermoelectric material by doping with the rare earth Dy. *Advanced Functional Materials*. 22(13), 2766–2774.
- Liang, J., Wang, T., Qiu, P., Yang, S., Ming, C., Chen, H., Song, Q., Zhao, K., Wei, T.-R. and Ren, D. (2019). Flexible thermoelectrics: from silver chalcogenides to full-inorganic devices. *Energy & Environmental Science*. 12(10), 2983–2990.
- Lin, J., Li, X., Qiao, G., Wang, Z., Carrete, J. s., Ren, Y., Ma, L., Fei, Y., Yang, B. and Lei, L. (2014). Unexpected high-temperature stability of β - Zn_4Sb_3 opens the door to enhanced thermoelectric performance. *Journal of the American Chemical Society*. 136(4), 1497–1504.
- Mansouri, H., Sajjadi, S. A., Babakhani, A. and Saberi, Y. (2021). Microstructure and thermoelectric performance evaluation of p-type $(Bi, Sb)_2Te_3$ materials

- synthesized using mechanical alloying and spark plasma sintering process. *Journal of Materials Science: Materials in Electronics*. 32(8), 9858–9871.
- Mayer, H., Mikhail, I. and Schubert, K. (1978). Über einige phasen der Mischungen ZnSbN und CdSbN. *Journal of the Less Common Metals*. 59(1), 43–52.
- Mi, W., Qiu, P., Zhang, T., Lv, Y., Shi, X. and Chen, L. (2014). Thermoelectric transport of Se-rich Ag₂Se in normal phases and phase transitions. *Applied physics letters*. 104(13).
- Minea, V. (2007) Using geothermal energy and industrial waste heat for power generation : in 2007 IEEE Canada electrical power conference. *IEEE*. 543–549.
- Mirela, V., Narcis, D. and Grozescu, I. (2015). Thermal behavior regarding the thermoelectric Zn₄Sb₃ obtained by melting and quenching method. *Nonconventional Technologies Review/Revista de Tehnologii Neconventionale*. 19(4).
- Mönkemeyer, K. (1905). Über zink-nntimonlegierungen. *Zeitschrift für anorganische Chemie*. 43(1), 182–196.
- Morrison, K. and Dejene, F. K. (2020). Thermal Imaging of the Thomson effect. *Physics*. (13), 137.
- Moustafa, S., Daoush, W., Ibrahim, A. and Neubaur, E. (2011). Hot forging and hot pressing of AlSi powder compared to conventional powder metallurgy route. *Materials Sciences and Applications*. 2(08), 1127.
- Mozharivskyj, Y., Janssen, Y., Harringa, J. L., Kracher, A., Tsokol, A. O. and Miller, G. J. (2006). Zn₁₃Sb₁₀: a structural and landau theoretical analysis of its phase transitions. *Chemistry of Materials*. 18(3), 822–831.
- Nylén, J., Andersson, M., Lidin, S. and Häussermann, U. (2004). The structure of α -Zn₄Sb₃: ordering of the phonon-glass thermoelectric material β -Zn₄Sb₃. *Journal of the American Chemical Society*. 126(50), 16306–16307.
- Perez-Taborda, J. A., Caballero-Calero, O., Vera-Londono, L., Briones, F. and Martin-Gonzalez, M. (2018). High thermoelectric zT in n-type silver selenide films at room temperature. *Advanced Energy Materials*. 8(8), 1702024.
- Poudeu, P. F., D'Angelo, J., Downey, A. D., Short, J. L., Hogan, T. P. and Kanatzidis, M. G. (2006). High thermoelectric figure of merit and nanostructuring in bulk p-type Na_{1-x}PbmSbyTem⁺². *Angewandte Chemie International Edition*. 45(23), 3835–3839.
- Qiu, A., Zhang, L. and Wu, J. (2010). Crystal structure, electronic structure, and thermoelectric properties of β -Zn₄Sb₃ from first principles. *Physical Review B*. 81(3), 035203.

- Ravel, B. and Newville, M. (2005). Athena, artemis, hephaestus: data analysis for X-ray absorption spectroscopy using IFEFFIT. *Journal of synchrotron radiation*. 12(4), 537–541.
- Rowe, D. M. (2018). Thermoelectrics handbook: macro to nano. CRC Press.
- Rull-Bravo, M., Moure, A., Fernández, J. and Martín-González, M. (2015). Skutterudites as thermoelectric materials: revisited. *RSC Advances*. 5(52), 41653–41667.
- Saini, A., Kumar, R. and Kumar, R. (2021). Introduction and brief history of thermoelectric materials : in thermoelectricity and advanced. *Thermoelectric Materials* Elsevier. 1–19.
- Seebeck, T. J. (1895). Magnetische polarisation der metalle und erze durch temperatur-differenz. W. Engelmann.
- Shi, X., Yang, J., Salvador, J. R., Chi, M., Cho, J. Y., Wang, H., Bai, S., Yang, J., Zhang, W. and Chen, L. (2011). Multiple-filled skutterudites: high thermoelectric figure of merit through separately optimizing electrical and thermal transports. *Journal of the American Chemical Society*. 133(20), 7837–7846.
- Shim, H. C., Woo, C.-S. and Han, S. (2015). Thermal cycling behavior of zinc antimonide thin films for high temperature thermoelectric power generation applications. *ACS Applied Materials & Interfaces*. 7(32), 17866–17873.
- Singh, S., Hirata, K., Byeon, D., Matsunaga, T., Muthusamy, O., Ghodke, S., Adachi, M., Yamamoto, Y., Matsunami, M. and Takeuchi, T. (2020). Investigation of thermoelectric properties of $\text{Ag}_2\text{S}_x\text{Se}_{1-x}$ ($x = 0.0, 0.2$ and 0.4). *Journal of Electronic Materials*. 49(5), 2846–2854.
- Snyder, G. J., Christensen, M., Nishibori, E., Caillat, T. and Iversen, B. B. (2004). Disordered zinc in Zn_4Sb_3 with phonon-glass and electron-crystal thermoelectric properties. *Nature Materials*. 3(7), 458–463.
- Sodhiya, A., Kumar, R., Singh, A. K. and Soni, S. (2021). Effect of Ba^{2+} doping on the structure and transport properties of $\text{Li}_{6.28}\text{Al}_{0.24}\text{La}_3\text{Zr}_2\text{O}_{12}$ solid electrolyte. *Applied Physics A*. 127(8), 584.
- Spitzer, D. (1970). Lattice thermal conductivity of semiconductors: a chemical bond approach. *Journal of Physics and Chemistry of Solids*. 31(1), 19–40.

- Sui, J., Li, J., He, J., Pei, Y.-L., Berardan, D., Wu, H., Dragoe, N., Cai, W. and Zhao, L.-D. (2013). Texturation boosts the thermoelectric performance of BiCuSeO oxyseLENides. *Energy & Environmental Science*. 6(10), 2916–2920.
- Tapiero, M., Tarabichi, S., Gies, J., Noguet, C., Zielinger, J., Joucla, M., Loison, J., Robino, M. and Herion, J. (1985). Preparation and characterization of Zn₄Sb₃. *Solar Energy Materials*. 12(4), 257–274.
- Tee, S. Y., Ponsford, D., Lay, C. L., Wang, X., Wang, X., Neo, D. C. J., Wu, T., Thitsartarn, W., Yeo, J. C. C. and Guan, G. (2022). Thermoelectric silver-based chalcogenides. *Advanced Science*. 9(36), 2204624.
- Ueno, K., Yamamoto, A., Noguchi, T., Li, C., Inoue, T., Sodeoka, S. and Obara, H. (2006). Effect of impurity oxygen concentration on the thermoelectric properties of hot-pressed Zn₄Sb₃. *Journal of Alloys and Compounds*. 417(1–2), 259–263.
- Ugai, Y. A., Averbakh, E. and Lavrov, V. (1963). Some electrical properties of the intermetallic compound beta-Zn₄Sb₃. *Soviet Physics–Solid State*. 4(11), 2393–2395.
- Ur, S.-C., Nash, P. and Kim, I.-H. (2003). Mechanical alloying and thermoelectric properties of Zn₄Sb₃. *Journal of materials science*. 38(17), 3553–3558.
- Wang, L., Yan, G., Dong, G., Qiao, S., Fu, G. and Wang, S. (2016). Enhanced light-induced transverse thermoelectric effect in c-axis inclined BiCuSeO thin films via Pb doping. *Optical Materials Express*. 6(8), 2537–2544.
- Zhang, J.-M., Ming, W., Huang, Z., Liu, G.-B., Kou, X., Fan, Y., Wang, K. L. and Yao, Y. (2013). Stability, electronic, and magnetic properties of the magnetically doped topological insulators Bi₂Se₃, Bi₂Te₃, and Sb₂Te₃. *Physical Review B*. 88(23), 235131.
- Zhang, L., Hong, X., Chen, Z., Xiong, D. and Bai, J. (2020). Effects of In₂O₃ nanoparticles addition on microstructures and thermoelectric properties of Ca₃Co₄O₉ compounds. *Ceramics International*. 46(11), 17763–17766.
- Zhang, T., Zhou, K., Li, X., Chen, Z., Su, X. and Tang, X. (2016). Reversible structural transition in spark plasma-sintered thermoelectric Zn₄Sb₃. *Journal of materials science*. 51.
- Zlatic, V. and Monnier, R. (2014). Modern theory of thermoelectricity. *OUP Oxford*.

Zou, T., Xie, W., Feng, J., Qin, X. and Weidenkaff, A. (2015). Recent developments in β -Zn₄Sb₃ based thermoelectric compounds. *Journal of Nanomaterials*.