Chalcogenide Glasses as promising Thermoelectric Materials.

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Glasses and chalcogenide glasses especially, have a potential yet to be explored as thermoelectric materials. They already possess a low thermal conductivity and can have an high Seebeck coefficient (S). The challenge lies on making them more electrically conducting without affecting too much the previously mentioned transport properties. We have shown [1] that the power factor, S^2/ρ (ρ: resistivity) of the $Cu_{x+y}Ge_{20-x}Te_{80-y}$ family of glasses prepared by melt spinning, is strongly improved by increasing the Cu concentration.

We also report more recent studies on a new family of glasses obtained in the Cu-Te-As system. Our results show that the melt spinning technique allows us to extend the Cu-Te-As glassy domain and leads to T_g values, that permit the use of these glasses in applications up to 100°C. A maximum S^2/ρ value of ~100$\mu WK^{-2}m^{-1}$ [2] was obtained for the $Cu_{30}As_{15}Te_{55}$ composition, a power factor twice that of the best value obtained for the Cu-Ge-Te system, confirming these chalcogenide glasses as potential candidates in the quest for new high-performance thermoelectric materials

References

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