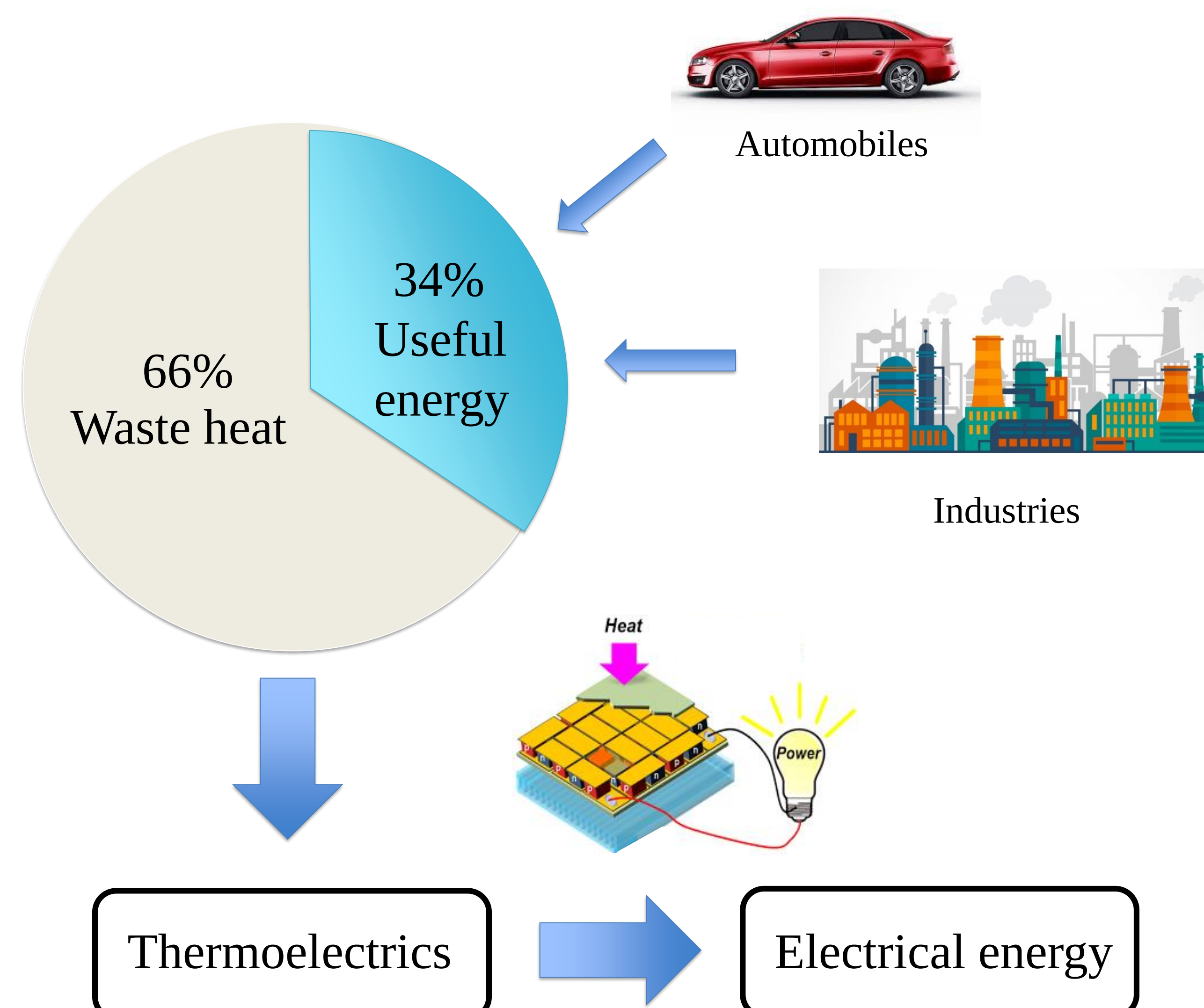


Thermoelectric properties of $\text{Mg}_2\text{Sn}_{0.75}\text{Ge}_{0.25}$ for power generation

U. Saparamadu¹, J. de Boor², Z. Ren¹

¹Department of Physics, University of Houston, Houston, TX, USA
²Institute of Materials Research, German Aerospace Center, Koeln, Germany

Overview



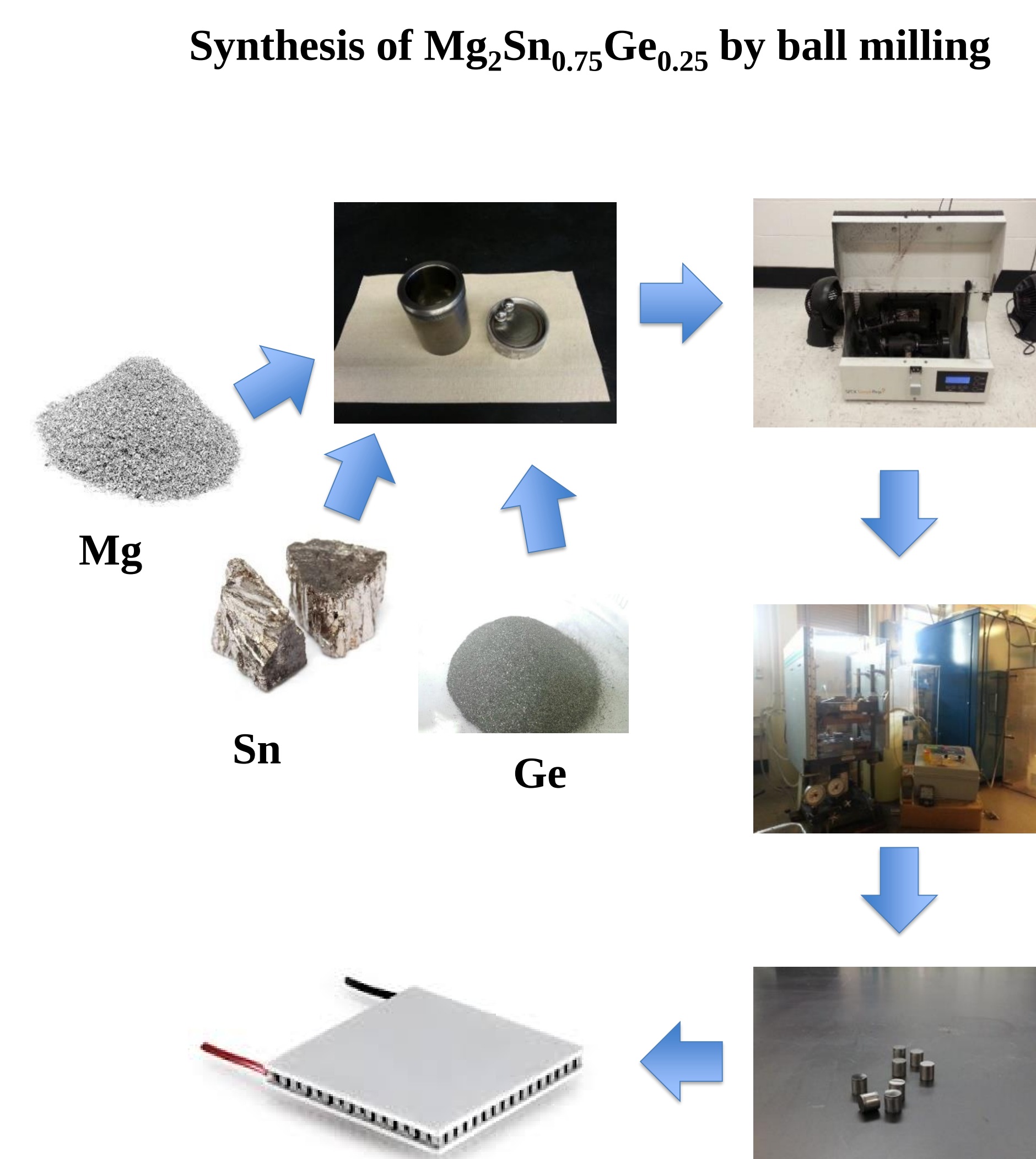
- Thermoelectric materials have a potential of converting heat to electricity
- Lower efficiency eliminates the usage of thermoelectrics in real world applications (Typical efficiency ~8%)
- Improve the thermoelectric performance and manufacture these materials at a low cost is very important



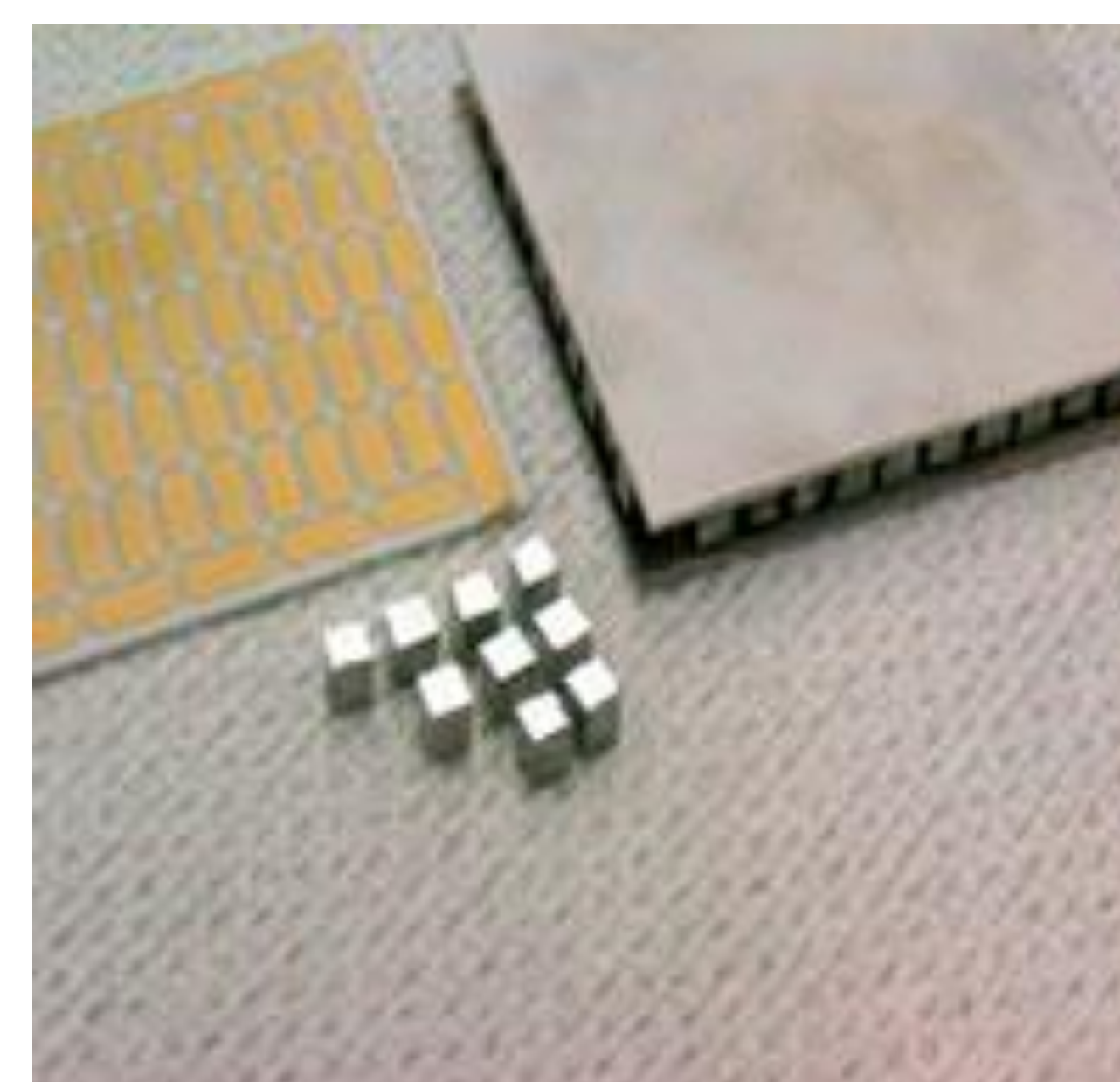
Thermoelectric materials used for power generation

https://www.nasa.gov/mission_pages/msl/index.html

Method

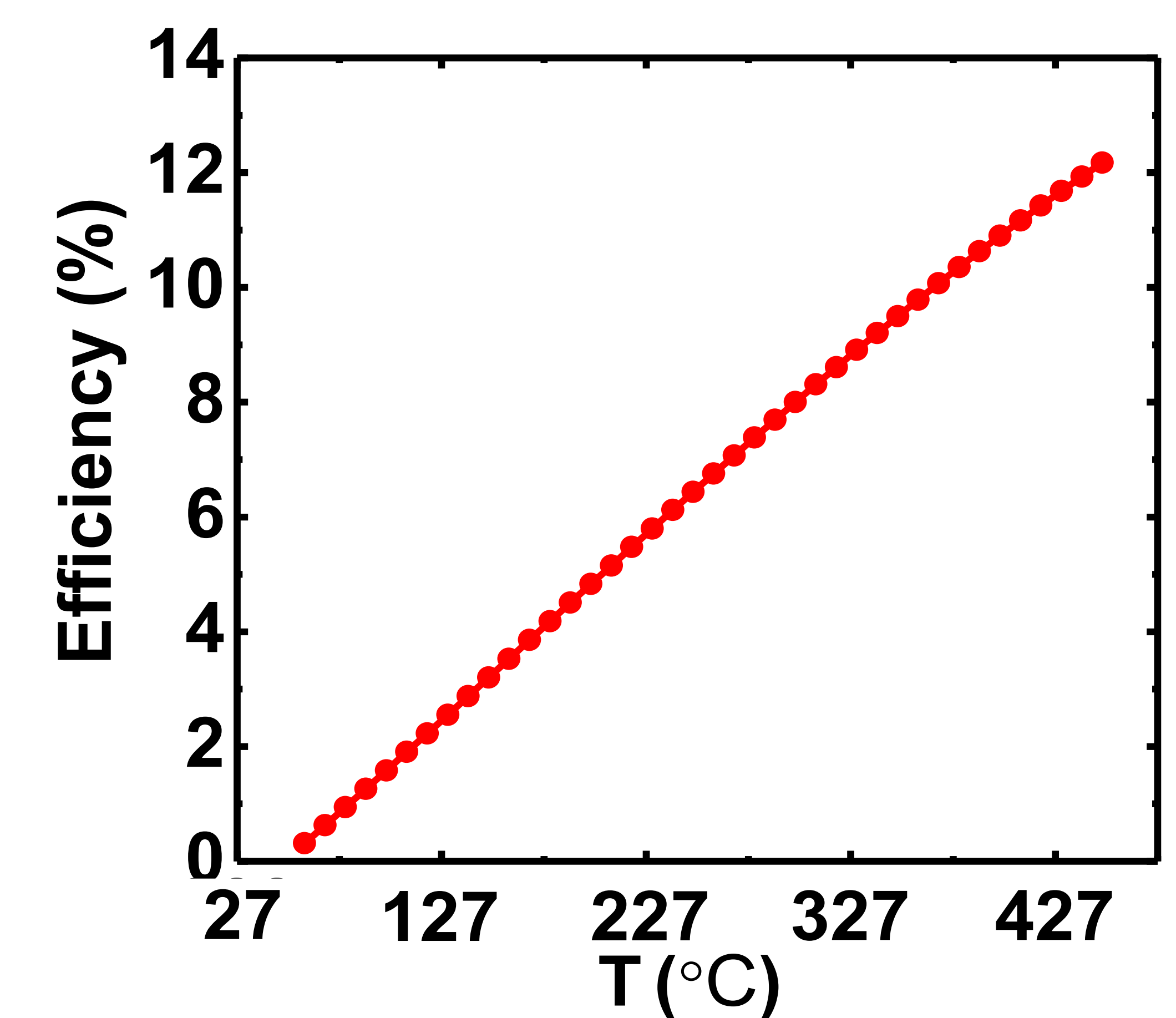


- All the elements are grind using a high energy ball milling machine
- Using hot pressing the ball milled powder can be densified



Hot pressed thermoelectric materials and the module

Results



- By this unique technique we found out that this material shows a outstanding efficiency of 12%
- This is the best efficiency reported for this type of material

Conclusion

- By ball milling and hot pressing an outstanding efficiency can be obtained for $\text{Mg}_2\text{Sn}_{0.75}\text{Ge}_{0.25}$
- Same technique can be used to other material systems so that this can improve the efficiency of different material systems

Acknowledgements

