

ThermoBuild Brief

A Newsletter Featuring Leading Voices in Thermoelectrics and Building Energy Technology

Issue #5 | July, 2026

Research Highlights

Our research activity is aligned with the development of thermoelectric oxides with improved performances to be used to build thermoelectric power generators (TEG's) working at high temperatures (up to 900°C). We have prepared a classically designed TEG consisting in 31 p-n pairs into a 50x50mm² module. In the TEG characterization, a study of the effects of different parameters, such as internal/external insulation, and improvement of the thermal contacts of TEG with the hot, and cold sources, has been performed. The maximum power generated was 119mW at 900°C hot side temperature and internal ΔT 644°C.

Expert Spotlight



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Technical Insight

- The oxide-based TEG's exhibit relatively low performances but, as a counterpart, they can work at high temperatures under air without degradation or loss of performances
- Some of the prepared modules were tested at 900°C in continuous mode for up to 2000h, while other was subjected to 100 thermal cycles between room temperature and 900°C, with no loss of properties in both cases. They indicate not only the stability of these compounds at high temperatures, but also that of the other components of the TEG.

Data Snapshot

Fabrication and testing of ceramic thermoelectric multi-leg module for high temperature energy conversion, *J. Alloy. Compd.* 1013, 178628 (2025), P. Amirkhizi, M. Hedayati, M. A. Madre, M. A. Torres, A. Sotelo, A. V. Kovalevsky, and Sh. Rasekh

<https://doi.org/10.1016/j.jallcom.2025.178628>

This paper reports on our first thermoelectric module, fabricated using 17 p-n pairs, with relatively high-power generation from high-temperature source, and very high thermal stability.

Up Next

" Our next step is simplifying the module design for an easy assembling, together with a decrease de number of elements forming the TEG structure, and reduce the amount of precious metals with the goal of achieving a low cost per Watt generated."