that is thick enough to carry the requisite electrical current was overcome. A critical advantage over prior art is that this device was constructed using all diffusion bonds and a minimum number of assembly steps.

The fabrication process and the materials used are described in the following steps:

1. Applying a thin refractory metal foil to both sides of lanthanum telluride. To fabricate the n-type leg of the advanced thermoelectric couple, the pre-synthesized lanthanum telluride coupon was diffusion bonded to the metal foil using a thin adhesion layer.
2. Repeating a similar process for the 14-11 Zintl p-type leg of the advanced thermoelectric couple.
3. Bonding thick CTE-matched metal plates on the metallized lanthanum telluride and Yb\textsubscript{14}MnSb\textsubscript{11} to form the hot and cold sides of the thermoelectric couple.

The calculated conversion efficiency of such an advanced couple would be about 10.5 percent, about 35 percent better than heritage radioisotope thermoelectric technology that relies on Si-Ge alloys. In addition, unlike Si-Ge alloys, these materials can be combined with many other thermoelectric materials optimized for operation at lower temperatures to achieve conversion efficiency in excess of 15 percent (a factor of 2 increase over heritage technology).

This work was done by Vilupanur A. Ravi, Billy Chun-Yip Li, and Jean-Pierre Fleurial of Caltech and Kurt Star of UCLA for NASA’s Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).

In accordance with Public Law 96-517, the contractor has elected to retain title to this invention. Inquiries concerning rights for its commercial use should be addressed to:

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