

NASA TECH BRIEF



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Segmented SiGe-PbTe Couples

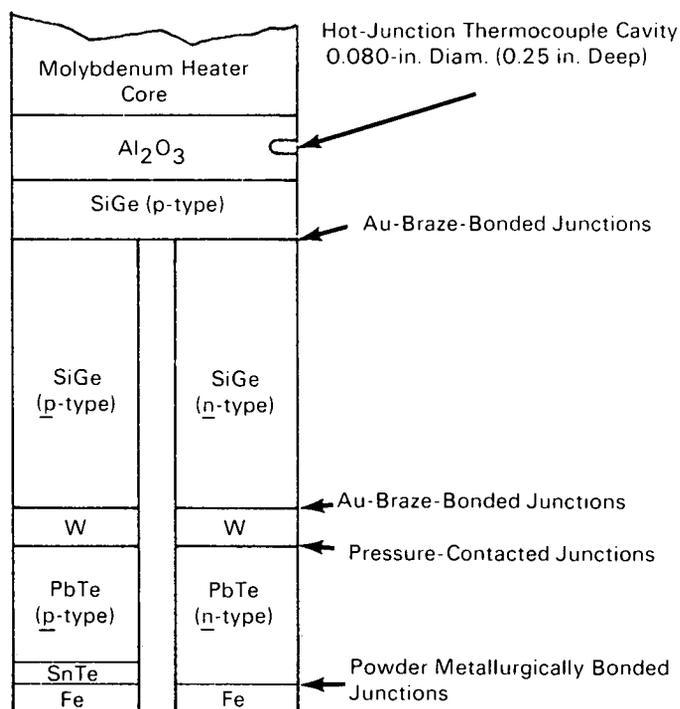


Fig. 1. Segmented Couple For Performance Testing

The problem:

Difference between SiGe and PbTe in thermal expansion causes problems in segmented couples.

The solution:

A completely new concept in the design of segmented couples incorporates an intermediate junction contacted by pressure, and eliminates the need for the complicated transition members that are otherwise required to bond materials differing greatly in thermal

expansion—for example, SiGe and PbTe, 4.5 and 18 microinches $\text{inch}^{-1} \text{ } ^\circ\text{C}^{-1}$, respectively. The intermediate junction (Fig. 1) contains a W-SiGe bonded composite, contacted by pressure to PbTe, having an associated contact resistivity of 100 to 200 $\mu\text{ohm-cm}^2$ at 800°K (527°K)—well below resistivities reported for bonded configurations.

Development of a reproducible and reliable intermediate junction between PbTe and SiGe will permit application of this combination in many requirements

(continued overleaf)

connected with direct conversion of energy, especially where high efficiency is essential in conversion; examples include remote terrestrial power supplies, auxiliary conversion devices associated with the use of waste heat, and portable power supplies for use with fossil fuels.

Notes:

1. This innovation may interest personnel concerned with direct conversion of energy.
2. Documentation is available from:
Clearinghouse for Federal Scientific
and Technical Information
Springfield, Virginia 22151
Price \$3.00
Reference: TSP69-10233

Patent status:

No patent is contemplated by NASA.

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