Contact of ZnSb thermoelectric material to metallic electrodes using S-Bond 400 solder alloy

ZnSb is one of the promising low-cost p-type thermoelectric materials for constructing waste heat recovery devices operating in the medium temperature region (250 – 400°C). To obtain high performance, these devices require stable and low resistance contacts between thermoelectric materials and metallic electrodes. In this paper, we investigate the joining of ZnSb to Ni and Ag electrodes using a commercial solder alloy S-Bond 400 and hot-pressing technique. Ti and Cr layers are also introduced as a diffusion barrier and microstructure at the interfaces is observed by scanning electron microscopy. We found that S-bond 400 solder reacts with Ag and Ni electrodes to form different alloys at the interfaces. Cr layer was found to be broken after joining, resulting in a thicker reaction/diffusion layer at the interface, while Ti layer was preserved.

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