

Cryogenic thermoelectric coolers with different passive branches

Tuesday 23 July 2024 14:00 (2 hours)

Cryogenic thermoelectric coolers can be widely used in aerospace industry for satellite cooling systems. However, the commercialization of thermoelectric cooling technology has been built on the Bi₂Te₃ alloys, which have been aimed at room temperatures. Therefore, suitable materials for cryogenic thermoelectric coolers are needed. In this paper, four thermoelectric coolers have been fabricated from active elements (polycrystalline Bi₈₅Sb₁₅) and different passive elements (Bi-2212 bars, Bi-2223 tapes, high purity copper bars and EuBCO tapes). The maximal temperature drops between the hot and cold sides are measured at both room temperatures and cryogenic temperatures (80K, 100K and 120K) without a magnetic field. The results show the possibility of fabricating thermoelectric coolers for cryogenic temperatures.

Submitters Country

P. R. China

Author: ZHANG, Hongwei (Key Laboratory of Cryogenic Science and Technology, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences)

Co-authors: SU, Haojian (Key Laboratory of Cryogenic Science and Technology, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences); HUANG, Hongmei (Key Laboratory of Cryogenic Science and Technology, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences); LI, Laifeng (Key Laboratory of Cryogenic Science and Technology, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences); HAO, Qingbin (Superconducting Materials Research Center, Northwest Institute for Nonferrous Metal Research); ZHOU, Yuan (Key Laboratory of Cryogenic Science and Technology, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences); ZHAO, Yuqiang (Key Laboratory of Cryogenic Science and Technology, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences)

Presenter: ZHANG, Hongwei (Key Laboratory of Cryogenic Science and Technology, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences)

Session Classification: Tue-Po-1.2

Track Classification: Tracks ICEC 29 Geneva 2024: ICEC 02: Cryocoolers, magnetic coolers and other coolers