



Prof. Bian Tian

Xi'an Jiaotong University, CHINA

Title:

Recent Progress of thin films thermocouples by MEMS Technologies

Abstract:

Temperature is one of the most important physical parameters for measurement in many fields. In the decision-making of covid-19 response in 2020, the human body temperature is tested accurately and conveniently in public places by the temperature measuring gun and thermal imager.

In the industrial field, accurate control of smelting temperature in the steel smelting process can significantly improve product quality. In the medical field, for pathological observation requires accurate measurement of human body temperature in real time. In the use of some therapeutic methods such as magnetic resonance imaging, thermal hysteresis therapy, the physical parameters of the equipment used need to be adjusted by temperature indicators. In the electromechanical field, for auxiliary facilities such as power generation mainframe equipment, engine propellers, and hydraulic oil, accurate temperature measurements are required to monitor the operation of the system and thus ensure the proper operation of the project.

The thermocouple is a passive device used for temperature measurement. Compared with traditional bulk thermocouples, thin film thermocouples (TFTCs) have typical two-dimensional characteristics and possess the advantages of small heat capacity and fast response speed. With the development of technology intelligence, integration and miniaturization, thin-film thermocouples based on Micro-Nano manufacturing technology are gradually taking the dominant position with the advantages of small size, light weight, low power consumption, high reliability, high sensitivity, easy integration and resistance to harsh working environment.

Biography:

Bian Tian was born in Xi'an, Shaanxi Province, China, on January 22, 1981. He received his B.S. and M.S. degrees from Xi'an Jiaotong University in 2003 and 2007, respectively.

In 2011, he received his PhD degree from Xi'an Jiaotong University under the supervision of Professor Zhuangde Jiang, a member of the Chinese Academy of Engineering. In the same year, he joined the School of Mechanical Engineering of Xi'an Jiaotong University as a lecturer and went to the University of California, Berkeley as a visiting scholar from 2017 to 2018. He became a professor in the School of Mechanical Engineering of Xi'an Jiaotong University in October 2020.

He has been working on ultra-high temperature and piezoresistive MEMS sensors for a long time and has been awarded the national talent program. He has published 49 SCI papers, granted 16 invention patents, won the second prize of National Technical Invention (2017), the first prize of Science and Technology of Shaanxi Province (2012), and won the Youth Science and Technology Award of Shaanxi Province (2020). He is the director of the Collaborative Innovation Platform of Advanced Sensing Technology and System Integration of the Ministry of Education and the vice president of the Institute of Intelligent Sensing Technology and System of Xi'an Jiaotong University (Yantai, China).

Currently, his research interests include high temperature sensing technology, flexible temperature sensor and MEMS micro-pressure sensing technology.