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A Batch Fabrication-compatible Multifunctional Thermal Sensor Based on Thin Film Thermocouple and Thermopile Elements

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Highlights

- A millimeter-scale multifunctional thermal sensor is designed, fabricated, and tested
- The passive sensor provides both temperature and heat flux
- The sensor is batch fabrication-compatible and comprised of high temperature materials

Abstract

A novel high temperature, multi-functional thermal sensor is presented which is capable of being batch-produced using industry standard microfabrication techniques. The thin film thermocouple and thermopile features were designed to provide both surface temperature and surface heat flux data simultaneously. In addition, its small size allows for installation and usage without significantly disrupting heat or fluid flow from the component of interest. Single crystal sapphire served as the substrate material for its cost effectiveness and high temperature compatibility.

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