

Temperature Profiles of Microheaters Using Fluorescence Microthermal Imaging

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A detailed knowledge of the temperature profile is critical in many microelectromechanical systems (MEMS) devices. We used fluorescent microthermal (FMT) imaging for measuring this profile in a MEMS microheater that is an integral part of a glucose-sensing chip. The temperature profile on the heater surface was measured for a range of applied powers below 1 mW. The maximum temperature at the heater center was found to vary linearly with the applied power from room temperature to ~50°C. The imaging was sensitive to temperature changes on the order of 0.1°C. Finite element modeling confirmed both the two-dimensional profile of the temperature on the heater surface as well as the dependence of the temperature on the applied power.

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