heaters **22** and **24** are calibrated so that the amount of electrical energy needed to provide a specific number of degrees of additional heat to each platform **14** and **16** is known over the entire temperature range being measured. In that manner, a power profile for the heaters **22** and **24** is obtained so that a null profile voltage is maintained by the thermopile **15** over the entire temperature range. With an analyte present on the sample platform **16**, the same heater power schedule is used and the temperature difference is monitored. As the two platforms **14** and **16** are heated in an identical manner, any temperature differences between the platforms **14** and **16** are sensed by the production of a thermopile voltage. Such temperatures differences are due to a chemical reaction or physical change occurring on the sample platform **16**. Measurements of the thermopile voltages provide the temperature differences between the platforms **14** and **16** and provides information relating to the chemical reaction or physical change occurring on the sample platform **16**. Alternative temperature operation, such as customized scans (including temperature steps and pulses), may be used to enhance the detection of chemical species.

FIG. **3** shows a differential scanning calorimeter similar to the microcalorimeter shown in FIG. **1** except that it has a single platform **29** suspended over a single pit **33** in order to enhance thermal isolation of the zones from the substrate. Reference and sample zones **14** and **16** are at opposite ends of the platform **29**. Neither thermopile lines **26** and **36** nor heaters **22** and **24** are shown connecting to wirebond pads (not shown). However, it is understood that connections to wirebond pads similar to those shown in FIG. **1** may be included. If desired, the microcalorimeter shown in FIG. **3** may be designed without built-in heaters **22** and **24**. In that event, a conventional oven (not shown) would be used to heat the microcalorimeter. An array of such microcalorimeters inside an oven (not shown) would be useful for DNA diagnostics. For example, each array element's sample zone **16** may be coated with a different selective coating for a specific DNA sequence. Hybridization on selected array elements can be observed via calorimetric difference signals when the array is heated through the characteristic temperature for DNA hybridizing.

An alternate embodiment of a microcalorimeter design shown in FIG. **4** includes a similar arrangement of components as described in FIG. **3** with one pit **33** underlying platform **29** with reference zone **14** and sample zone **16** at opposite ends of platform **29**. The microcalorimeter design shown in FIG. **4** includes a suspended bridge **60** that provides additional thermal isolation for platform **29** from its surroundings. The suspended bridge **60** is suspended over pit **33** by six supporting arms **62**, **64**, **66**, **68**, **70**, and **72**. Four supporting arms **47**, **49**, **63**, and **65** extend from the suspended bridge **60** to the platform **29**. Like the microcalorimeter shown in FIG. **3**, reference and sample zones **14** and **16** are at opposite ends of the platform **29**. Heater line **22** begins and ends on supporting arm **64**. The heater line **22** traverses the suspended bridge **60** and crosses arm **47** to enter the platform **29**. The intermediate part of the heater line **22** passes through the sample area **16** and returns to the suspended bridge **60** via supporting arm **49**. Heater line **24** begins and ends on supporting arm **62**. The heater line **24** traverses bridge **60** and is connected to the platform **29** via supporting arms **47** and **49**. The intermediate part of the heater **24** provides heat to the reference zone **14**. Thermopile connecting line **36** begins at supporting arm **64** and enters the suspended bridge **60**. The thermopile connecting line **36** traverses the suspended bridge **60**, crosses over the heater line **22**, and enters supporting arm **47** where it turns and enters the platform **29**. The thermopile connecting line **36** then becomes part of the thermopile **15**. The thermopile **15** is connected to thermopile connecting line **26** on the platform **29**. Thermopile connecting line **26** crosses the supporting arm **49** to the suspended bridge **60** and then crosses over the heater line **24** to terminate at supporting arm **62**. A branch line **27** connected to thermopile connecting line **26** traverses the suspended bridge **60** and terminates near the supporting arm **47**. Likewise, a branch line **37** connected to the thermopile connecting line **36** near the supporting arm **64** traverses the suspended bridge **60** and terminates just before the supporting arm **49**. The purpose of the branch lines **27** and **37** is to provide thermal balance to the suspended bridge **60** with respect to the lines **26** and **36**. Although not shown, wirebond pads similar to those shown in FIG. **1** may be connected to the ends of the heaters **22** and **24** and the thermopile lines **26** and **36**.

An alternate embodiment of this invention is illustrated in FIG. **5**. In this alternate embodiment, suspended platform **29** is held by supporting arms **47** and **49**, and a single heater **23** heats both reference and sample zones **14** and **16** of the suspended platform **29**. The arrangement of thermopile **15** has thermocouple junctions located at the reference and sample zones. Wirebond pads (not shown) may be connected to the ends of the heater lines **23** and thermopile lines **26** and **36**. Since only one heater is used in this embodiment, calibration of the instrument over a temperature range may indicate some non-null voltages (unbalance signals) in the thermopile at various temperatures. Knowledge of the thermopile voltage valuation over the temperature range is then used as the base profile for subsequent measurements of samples. Such unbalance signals are subtracted from the subsequent measurements.

While the description above refers to particular embodiments of the present invention, it will be understood that many modifications may be made without departing from the spirit thereof. The accompanying claims are intended to cover such modifications as would fall within the scope and spirit of the present invention.

What is claimed is:

1. A micron-scale calorimeter on a single chip for providing microscopic calorimetry measurements of small samples, the microcalorimeter comprising:

a substrate for said chip,

a reference zone and a separate sample zone, the zones located on at least one suspended platform, said platform suspended over at least one pit etched into said substrate, said zones positioned close to each other to minimize temperature drift in the environment, said zones being thermally isolated from each other;

at least one heater for uniformly heating said zones; and

a single thermopile comprising a plurality of thermocouple junctions, a first set of said plurality of junctions being integrated into said reference zone and a second set of said plurality of junctions being integrated into said sample zone.

2. The microcalorimeter of claim **1** wherein said reference zone is located on a first suspended platform and said sample zone is located on a second suspended platform, said thermopile crossing from said first set of junctions on said first suspended platform to said second set of junctions on said second suspended platform.

3. The microcalorimeter of claim **1** wherein said reference zone is located on one end of said suspended platform and said sample zone is located at the opposite end of said