tallization temperature. In addition, the latter quantity also evinces apparently unexplainable behavior around the phase transition temperature.

We claim:

1. A differential analysis apparatus comprising:

means for holding a sample and means for holding a reference;

means for subjecting the sample in the sample means and a reference in the reference means to an externally applied disturbance in acccord with a prescribed function comprising the sum of a linearly changing part and a periodically changing part;

means for receiving data representative of differential signals resulting from the sample and the reference being subjected to the externally applied disturbance in accord with the prescribed function; and

means for processing the data to provide at least one characteristic parameter of the sample and to separate the at least one parameter directly into components relating to an energy storage portion and an energy loss portion of the at least one parameter.

2. The apparatus of claim **1** wherein the apparatus is a power compensation differential scanning calorimetry instrument.

3. The apparatus of claim **1** wherein the apparatus is a heat flux differential scanning calorimetry instrument.

4. The apparatus of claim **1** wherein the periodically changing part comprises a sinusoidal function and the linearly changing part comprises a linear cooling or heating scan, wherein the sinusoidal function is superimposed on the linear cooling or heating scan.

5. The apparatus of claim **1** wherein the characteristic parameter is heat capacity.

6. A method of analyzing a sample using a differential analysis apparatus comprising:

subjecting the sample and a reference to an applied disturbance in accord with a prescribed function comprising the sum of a linearly changing part and a periodically changing part;

detecting a differential signal representative of at least one characteristic parameter of the sample; and

processing the signal directly into components relating to an energy storage portion and an energy loss portion of the at least one parameter.

7. The method of claim **6** wherein the applied disturbance is temperature change.

8. The method of claim **7** wherein the characteristic parameter is heat capacity.

9. A method of analyzing a sample using a differential analysis apparatus comprising:

subjecting the sample and a reference to an externally applied disturbance in accord with a prescribed function comprising a periodically changing part having a specified frequency;

detecting a differential signal representative of at least one characteristic parameter of the sample;

processing the signal to determine a factor relating to a universal calibration function, wherein said processing utilizes data collected during the analysis of the sample and does not require collecting data during a separate calibration experiment; and

using the factor relating to the universal calibration function to provide an energy loss portion and an energy storage portion of the characteristic parameter.

10. The method of claim **9** wherein the applied disturbance is temperature change.

11. The method of claim **10** wherein the characteristic parameter is heat capacity.

12. The method of claim **10** wherein the periodically changing part comprises a sinusoidal function, and wherein the prescribed function further comprises a linearly changing part comprising a linear cooling or heating scan, wherein the sinusoidal function is superimposed on the linear cooling or heating scan.

13. The method of claim **10** wherein the characteristic parameter relates to a time-dependent thermal event of the sample.

14. A differential analysis apparatus comprising:

a sample holder and a reference holder;

a thermal device for subjecting a sample in the sample holder and a reference in the reference holder to a temperature change in accord with a prescribed function comprising the sum of a linearly changing part and a periodically changing part;

computing means for (i) receiving data representative of differential signals resulting from the sample and the reference being subjected to the temperature change in accord with the prescribed function, and for (ii) processing the data to provide at least one characteristic parameter of the sample and to separate the at least one parameter directly into components relating to an energy storage portion and an energy loss portion of the at least one parameter.

15. A method of analyzing a sample using a power compensated differential scanning calorimeter comprising:

subjecting the sample and a reference to a temperature change in accord with a prescribed function comprising the sum of a linearly changing part and a periodically changing part having a specified frequency and a specified amplitude;

detecting an amplitude signal and a phase signal, measured with respect to a phase of the prescribed function, of a differential power signal; and

processing the amplitude signal and the phase signal directly into components relating to an energy storage portion and an energy loss portion of a complex specific heat derived from the differential power signal.

16. A method of analyzing a sample using a power compensated differential scanning calorimeter comprising:

subjecting the sample and a reference to a temperature change in accord with a prescribed function comprising the sum of a linearly changing part and a periodically changing part having a specified frequency and a specified amplitude;

detecting an amplitude signal and a phase signal, measured with respect to a phase of the prescribed function, of a differential power signal;

processing the amplitude signal and the phase signal to determine a factor relating to a universal calibration function; and

using the factor relating to the universal calibration function to provide separate components relating to an energy storage portion and an energy loss portion of a complex specific heat derived from the differential power signal.

17. A method of analyzing a sample using a heat flux differential scanning calorimeter comprising:

subjecting the sample and a reference to a temperature change in accord with a prescribed function comprising the sum of a linearly changing part and a periodically changing part having a specified frequency and a specified amplitude;