CLAIMS

1. A gas conditioning apparatus comprising:

a substrate block comprising one or more fluid ports on an upper surface of the substrate block, wherein the substrate block has a first length along a sidewall, the substrate block comprising an inlet port at a first end and an outlet port at a second end, and wherein a flow passage extends within the substrate block between the inlet port and the outlet port and fluidically communicates with the one or more fluid ports; and

at least one multiple zone heater strip on the sidewall of the substrate block, wherein the at least one multiple zone heater strip extends between the first end and the second end and controls an internal temperature within a zone of the substrate block, wherein the zone has a second length that is less than or substantially equal to the first length.

2. The gas conditioning apparatus of claim 1, wherein the zone is a first zone, wherein the first zone is to have a first temperature, wherein a second zone is adjacent to the first zone, the second zone is to have a second temperature that is substantially different from or substantially equal to the first temperature.

3. The gas conditioning apparatus of claim 1, wherein the at least one multiple zone heater strip comprises a plurality of resistive elements electrically coupled in parallel, wherein the plurality of resistive elements is distributed along the first length of the sidewall of the substrate block, wherein the substrate block comprises a plurality of temperature zones, and wherein ones of the plurality of resistive elements are each adjacent to ones of the plurality of temperature zones.

4. The gas conditioning apparatus of claim 3, wherein the plurality of resistive elements comprises a first resistive element and an adjacent second resistive element, wherein the first resistive element has a first resistance and a second resistive element has a second resistance, and wherein the first resistance is greater than the second resistance.

5. The gas conditioning apparatus of claim 3, wherein the ones of the plurality of resistive elements are distributed along the first length of the sidewall of the substrate block,

and wherein resistance of the ones of the plurality of resistive elements progressively decreases from the first end to the second end.

6. The gas conditioning apparatus of claim 3, wherein individual ones of the plurality of resistive elements are each electrically coupled to an independent power source.

7. The gas conditioning apparatus of claim 6, wherein the sidewall is a first sidewall, the at least one multiple zone heater strip comprises a first heater strip, wherein the substrate block comprises a second sidewall opposite the first sidewall, the second sidewall has a third length, and wherein a second heater strip is attached along the second sidewall and extends along the third length.

8. The gas conditioning apparatus of claim 7, wherein the second heater strip is substantially identical to the first heater strip.

9. The gas conditioning apparatus of claim 1, wherein the sidewall comprises a recessed portion, wherein the recessed portion has a third length that is less than or equal to the first length, wherein the at least one multiple zone heater strip extends along the recessed portion, and wherein the at least one multiple zone heater strip has a fourth length that is less than or approximately equal to the third length.

10. The gas conditioning apparatus of claim 3, wherein the at least one multiple zone heater strip comprises the plurality of resistive elements embedded within a polymer film.

11. The gas conditioning apparatus of claim 10, wherein the polymer film comprises a polyimide or a polyfluorocarbon.

12. A system, comprising:

a gas conditioning apparatus comprising:

a substrate block comprising one or more fluid ports on an upper surface of the substrate block, the substrate block has a first length along a sidewall, the substrate block comprising an inlet port at a first end and an outlet port at a second end, and wherein a flow passage extends within the substrate block

between the inlet port and the outlet port and fluidically communicates with the one or more fluid ports; and

at least one heater strip on the sidewall of the substrate block,

wherein the at least one heater strip controls an internal temperature within a temperature zone of the substrate block, and wherein the temperature zone has a second length that is at least a portion of the first length,

and wherein the at least one heater strip is electrically coupled to a heater controller.

13. The system of claim 12, wherein the gas conditioning apparatus is within an enclosure.

14. The system of claim 12, wherein the substrate block comprises multiple temperature zones.

15. The system of claim 12, wherein the at least one heater strip comprises multiple resistive elements.

16. The system of claim 15, wherein the heater controller comprises multiple power channels electrically coupled to the multiple resistive elements.

17. A method for handling a process gas, comprising:

introducing the process gas into a gas conditioning apparatus comprising:

a substrate block comprising one or more fluid ports on an upper surface of the substrate block, the substrate block has a first length along a sidewall, the substrate block comprising an inlet port at a first end and an outlet port at a second end, and wherein a flow passage extends within the substrate block between the inlet port and the outlet port and fluidically communicates with the one or more fluid ports; and

at least one heater strip on the sidewall of the substrate block; and

controlling temperatures within zones of the substrate block.

18. The method of claim 17, wherein controlling the temperatures within the zones of the substrate block comprises electrically coupling the at least one heater strip to a heater controller.

19. The method of claim 18, wherein the at least one heater strip comprises a plurality of resistive elements electrically coupled to the heater controller, wherein the plurality of resistive elements comprise individual resistive elements distributed along the at least one heater strip.

20. The method of claim 19, wherein adjacent ones of the plurality of resistive elements comprise different resistances.

21. The method of claim 19, wherein adjacent ones of the plurality of resistive elements have progressively smaller resistances wherein temperature decreases along the at least one heater strip from a first resistive element having a highest resistance to a terminal resistive element having a lowest resistance.

22. The method of claim 19, wherein adjacent ones of the plurality of resistive elements have progressively larger resistances, wherein temperature decreases along the at least one heater strip from a first resistive element having a lowest resistance to a terminal resistive element having a highest resistance.