the holes in the gas delivery injectors and the gas exhaust manifolds are chosen so that the substrates are uniformly exposed to the gas from the delivery gas injectors.

[0007a] According to an aspect, there is provided an apparatus for the treatment of substrates comprising: a process chamber capable of holding a plurality of substrates; wherein the process chamber is substantially cylindrical in shape having a longitudinal axis; wherein the process chamber comprises one or more injector manifolds contained therein, the one or more injector manifolds having longitudinal axes substantially parallel to the longitudinal axis of the process chamber; wherein the process chamber comprises one or more exhaust manifolds contained therein, the one or more exhaust manifolds having longitudinal axes substantially parallel to the longitudinal axis of the process chamber; wherein the process chamber comprises one or more sheaths for holding thermocouples contained therein, the one or more sheaths for holding thermocouples having longitudinal axes substantially parallel to the longitudinal axis of the process chamber; wherein the process chamber is substantially closed at one end of the cylindrical shape with penetrations for the one or more injector manifolds, the one or more exhaust manifolds, and the one or more sheaths for holding thermocouples; and wherein the process chamber is open at the opposite end of the cylindrical shape.

[0008] These and other advantages are achieved in accordance with the present invention as described in detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] To facilitate understanding, identical reference numerals have been used, where possible, to designate identical elements that are common to the figures. The drawings are not to scale and the relative dimensions of various elements in the drawings are depicted schematically and not to scale.

[0010] The techniques of the present invention can readily be understood by considering the following detailed description in conjunction with the accompanying drawings, in which:

[0011] FIG. 1 is a schematic illustration of a processing system according to one embodiment of the present invention.

[0012] FIG. 2 is a schematic illustration of a cross-sectional view through the processing system of FIG. 1.

[0013] FIG. 3 is a schematic illustration of a cross-sectional view through the processing system of FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

[0014] After considering the following description, those skilled in the art will clearly realize that the teachings of the invention can be readily utilized in the manufacture of PV solar cells or TF modules.

[0015] One configuration of PV solar energy systems comprises PV solar modules. One version of PV solar modules may be constructed of a plurality of PV solar cells connected in series or parallel. The PV solar cells may be based on single crystal semiconductor substrates or on polycrystalline semiconductor substrates. Examples of suitable semiconductor substrates comprise Si, poly-Si, and GaAs, among others. For economy of language within the current disclosure, the phrase "PV solar cell" will be