[0010] One ~~embodiment~~ aspect includes a spin coating apparatus having a substrate holder configured to hold a substrate horizontally during a spin coating process, such as by using a vacuum chuck. A rotation mechanism, such as a motor, is connected to the substrate holder. The rotation mechanism is configured to rotate the substrate holder around an axis of rotation. The apparatus includes a liquid dispenser configured to dispense a liquid material onto a working surface of the substrate when the substrate is disposed on the substrate holder. The working surface is generally planar and located opposite to a bottom surface, of the substrate, that contacts the substrate holder. The apparatus includes a fluid-flow member having a substrate-facing surface. The fluid-flow member is configured to be positioned such that the substrate-facing surface is positioned vertically above the working surface of the substrate when the substrate is disposed on the substrate holder. At least a portion of the substrate-facing surface is curved such that a given vertical distance between the substrate-facing surface and the working surface varies radially relative to a given radial distance from the axis of rotation. In other words, while the working surface of the substrate is generally planar, the fluid-flow member suspended above is curved and thus a given height of the substrate-facing surface above the working surface depends on a given radius of the substrate. Another aspect includes a spin coating apparatus for coating substrates, the spin coating apparatus having a substrate holder configured to hold a substrate horizontally during a spin coating process. A rotation mechanism is connected to the substrate holder. The rotation mechanism is configured to rotate the substrate holder around an axis of rotation. The apparatus includes a liquid dispenser configured to dispense a liquid material onto a working surface of the substrate when the substrate is disposed on the substrate holder. The working surface is generally planar and located opposite to a bottom surface, of the substrate, that contacts the substrate holder. The apparatus includes a fluid-flow member having a substrate-facing surface. The fluid-flow member is configured to be positioned such that the substrate-facing surface is positioned vertically above the working surface of the substrate when the substrate is disposed on the substrate holder. The fluid-flow member defines an approximately circular opening centered around the axis of rotation and is configured such that a diameter of the defined opening can be increased and decreased.

[0011] Another ~~embodiment~~ aspect includes a method for manufacturing semiconductor devices. This method has multiple steps including positioning a

substrate on a substrate holder. The substrate holder holds the substrate horizontally and has an axis of rotation. The substrate has a bottom surface that contacts the substrate holder, and a working surface opposite to the bottom surface. In another step, a fluid-flow member is positioned above the substrate holder. The fluid-flow member has a substrate-facing surface that is positioned vertically above the working surface at a predetermined average vertical distance or average height above the working surface. At least a portion of the substrate-facing surface is curved such that a given vertical distance between the