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(54) **METHOD AND APPARATUS FOR CLEANING SUBSTRATES USING LIQUID CARBON DIOXIDE**

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(57) **ABSTRACT**

Methods for cleaning a microelectronic substrate in a cluster tool are described that include placing the substrate in a pressure chamber of a module in a cluster tool; pressurizing the pressure chamber; introducing liquid CO_2 into the pressure chamber; cleaning the substrate in the pressure chamber; removing the liquid CO_2 from the pressure chamber, depressurizing the pressure chamber, and removing the substrate from the pressure chamber. Apparatus for processing a microelectronic substrate are also disclosed that that include a transfer module, a first processing module that employs liquid carbon dioxide as a cleaning fluid coupled to the transfer module, a second processing module coupled to the transfer module, and a transfer mechanism coupled to the transfer module. The transfer mechanism is configured to move the substrate between the first processing module and the second processing module.

32 Claims, 4 Drawing Sheets