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(54) Title: METHODS AND APPARATUS FOR CLEANING SEMICONDUCTOR WAFERS

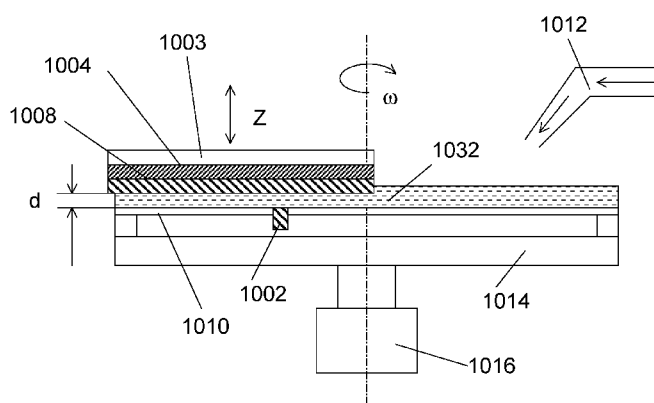


Fig. 1 A

(57) Abstract: A method for cleaning semiconductor substrate using ultra/mega sonic device comprising holding a semiconductor substrate by using a chuck, positioning a ultra/mega sonic device adjacent to the semiconductor substrate, injecting chemical liquid on the semiconductor substrate and gap between the semiconductor substrate and the ultra/mega sonic device, changing gap between the semiconductor substrate and the ultra/mega sonic device for each rotation of the chuck during the cleaning process. The gap can be increased or reduced by $0.5\lambda/N$ for each rotation of the chuck, where λ is wavelength of ultra/mega sonic wave, N is an integer number between 2 and 1000. The gap is varied in the range of $0.5\lambda n$ during the cleaning process, where λ is wavelength of ultra/mega sonic wave, and n is an integer number starting from 1.



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