

ABSTRACT OF THE DISCLOSURE

METHOD OF PLANARIZING AN UPPER SURFACE OF A SEMICONDUCTOR SUBSTRATE IN A PLASMA ETCH CHAMBER

A method of planarizing an upper surface of a semiconductor substrate in a plasma etch chamber comprises supporting the substrate on a support surface of a substrate support assembly that includes an array of independently controlled thermal control elements therein which are operable to control the spatial and temporal temperature of the support surface of the substrate support assembly to form independently controllable heater zones which are formed to correspond to a desired temperature profile across the upper surface of the semiconductor substrate. The etch rate across the upper surface of the semiconductor substrate during plasma etching depends on a localized temperature thereof wherein the desired temperature profile is determined such that the upper surface of the semiconductor substrate is planarized within a predetermined time. The substrate is plasma etched for the predetermined time thereby planarizing the upper surface of the substrate.

FIG. 3B