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(54) Title: APPARATUS AND METHOD FOR REDUCING CONTAMINATION ON THERMALLY PROCESSED SEMICONDUCTOR SUBSTRATES

(57) Abstract: In an apparatus and a method for thermal processing semiconductor substrates, such as semiconductor wafers, a reaction chamber for processing each substrate with a reactive gas when the substrate is held within the chamber is provided. At least one element forming part of the chamber or associated with the chamber, and which will contact the reactive gas(es) used for thermal processing, is constructed of a metal that is coated with a silicon or silica-containing layer. The primary silicon or silica-coated metals used are stainless steel or aluminum or an aluminum alloy. It has been found particularly advantageous to coat stainless steel reaction chamber inlet and exhaust flanges and associated tubing with the silicon or silica-containing layer to a coating thickness greater than about 1000Å, and preferably in the range of 1200Å to 4800Å, using a chemical vapor deposition (CVD) process at a temperature in the range of 300-400°C for stainless steel and 200-600° for aluminum. The use of silicon- or silica-coated stainless steel reduces metal corrosion that could occur when the flanges and tubing contact reactive gases, such as steam, and also thereby reduces or eliminates contamination, such as iron and iron oxide contamination, on the semiconductor substrates thermally processed with the reaction gases within the reaction chamber.

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