

ABSTRACT OF THE INVENTION

TITLE OF THE INVENTION: Method and apparatus for deposition removal and recycle cleaning of copper interconnect semiconductor process kits.

Semiconductor process kits are critical components within the semiconductor manufacturing equipment, and they require recycle cleaning for reuse so as to completely remove contamination particles to prevent inducing deposition defects and affects yield. Contamination within the process kits occurs because of the accumulation of deposited layers peel off due to repeated exposure to the deposition process. Therefore, there is a critical need to do deposition removal and recycle cleaning of the process kits for reuse. However, most semiconductor process kits are made from a combination of stainless steel or aluminum, and may contained copper, titanium, and quartz and ceramics materials. Therefore, each deposition removal and recycling precision cleaning process for different process kits must be custom-made for the specific process kits and component, exposed surfaces and nature of contamination as well as process compatibility. This invention provides a Best-Known-Method (BKM) and apparatus for deposition removal and recycle cleaning, such as chemical stripping, acid etching, mix-acid cleaning and rinsing, mechanical cleaning, thin-film thermal coatings and surface treatment, etc. The choice and optimization of these BKM are based on the knowledge of the substrate materials to be cleaned and of the type of deposited contaminants to be removed. This invention is effective in reducing the levels of surface contaminants, such as particles, ionic contaminants and some hydrocarbons that are introduced during the semiconductor production process, without corroding, damaging or altering the process kits material and surface morphology.

FIGURE 1