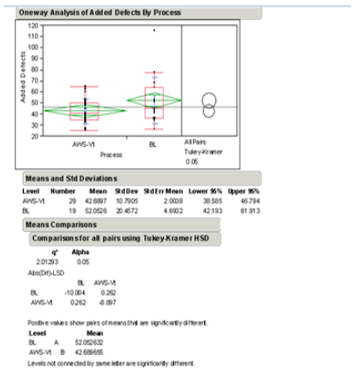
All Wet Resist Strip for Improved Semiconductor Process and Product Improvement

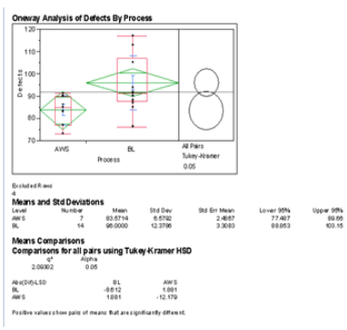
Murli Bashyam
TMG, Member of Technical Staff, Texas Instruments Inc.
13011 TI Blvd, Dallas, TX - 75243

Conventionally, plasma ash followed by a wet clean has been used to strip implanted photoresists on all semiconductor technology process flows and nodes. This paper describes the theory and implementation of an All Wet Strip (AWS) process at various post implant levels in the process flow, thus eliminating the need for a plasma treatment. Plasma treatment post implants have shown to add product yield limiting defects most likely eliminated by an All Wet Strip (AWS) process; successfully contributing to cycle time, capacity, cost and yield improvement for semiconductor chips. AWS involves the use of a sulfuric acid and hydrogen peroxide mixture for stripping implanted photo resists, the effectiveness of which has a dependency on the ion implant dose, energy and photo resist type. The paper describes the unique challenges that were overcome to bring the concept from an experimental stage to actual implementation, the process integration plus device sensitivities involved in ramping a process in a volume 300mm semiconductor wafer fab for complex technologies.

The below plots illustrate defect density (DD) improvements, seen on in-line defect inspections which ultimately translate into product yield enhancement.



SWR POLY Data



SWR LDD (Post Poly) Data

The box plots show that the AWS wafers are statistically better than the baseline, on inspections performed in-line post the Vt (SWR Poly Data) and LDD implants (SWR LDD (Post Poly Data)), in a 65nm CMOS process flow.