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Method to reduce particles and defects on unprocessed wafers caused by clusterization and cross contamination from processed wafers

SANKET SANT, Lam Research Corporation — One of the leading problems in the semiconductor industry with device scaling is defects and particles. Of this the most important ones are particles that can clusterize (condensate) with exposure to atmosphere. These clusters can be formed by residual halides or halide structures on the wafer surface reacting with surface moisture which is unavoidable. Such clusters can prove detrimental to the processed wafer, but more interestingly can migrate inside the FOUP onto unetched wafers. This migration of clusters can cause micro masking and other defects when these wafers are processed. This reduces the wafer yield and is challenging to resolve as we move towards smaller nodes. In this work, different methods of eliminating cross condensation defects and avoiding cluster formation on processed wafers are discussed. UV, Ozone and heat are the primary candidates explored and the mechanism behind each method is explored and optimized. Impact of each mechanism on wafer yield, part corrosion in a reactor platform and wafer throughput has been studied.

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