## **Semiconductor Manufacturing Going Green - Role of Chemical Mechanical Planarization (CMP) Process**

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Semiconductor industry continues to be meticulous in managing the real estate on the silicon wafer, especially with the nodes size entering the angstrom era. However, industry's carbon footprint does not show any signs of slowdown while it ascents exponentially, stressing the indisputable need for environmental friendly measures. The US CHIPS Act 2022, is keen on analyzing the environmental impact of semiconductor manufacturing facilitated by various hazardous chemicals and leading to a significant amount of chemical waste generation. Huge strides in this direction are already in place at Intel to achieve net-positive water and zero waste to landfills by 2030.

One such process crucial in the semiconductor industry is chemical mechanical planarization (CMP) which uses a wide variety of chemicals, to fabricate super flat and pristine surfaces. While making sure the quality of the final processed wafer is not compromised, use of environmentally friendly chemicals in CMP and post-CMP cleaning solutions are the need of the hour. The process also consumes several gallons of water per wafer, which also highlights the scope for lowering the water consumption rates. While 80-90% of the chemicals used are let downstream without even participating in the actual process, the focus of the engineering teams is to develop CMP process in such a way that the yield goals are met with less hazardous materials and minimal chemical wastage. This eventually aids the industry to achieve high water recycle rate and reduced power consumptions during the chemical mixed processed water treatment.