A Discussion of the Role of Organics in Device Processing

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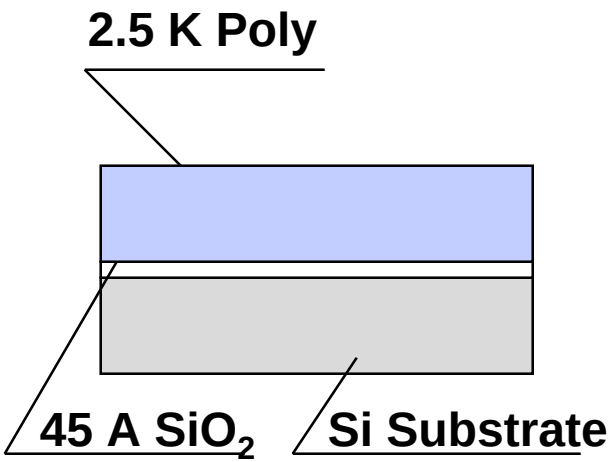
Front End of Line Clean - Organic Level in Oxide



•SIMS is used as C probe by depth profiling from Poly

•The concentration of C in oxide is calibrated against a wafer with a known C concentration prepared by ion implantation

•C concentration is given in atoms/cm2

- Organic contamination is believed to be one of the critical factors affecting gate oxide integrity
- In actual manufacturing process, time windows (1-8 hrs) are imposed on gate oxidation after pre-gate clean, and poly deposition after gate oxidation, partly due to concerns on organic contamination
- The widely used TOF-SIMS, or TD-GC-MS, only gives the info on fragments of organic species absorbed at RT on wafer surfaces, not C concentration as required by NTRS
- This design for the analysis of C in oxide reflects the actual C trapped in oxide with all the thermal processing in a normal manufacturing process.
- The results may be more meaningful for assessing the impact of C on the electrical performance of devices