

PLASMA QUEST LTD's TECHNOLOGY

The Plasma Quest Ltd technology (HiTUS) is a process based on the remote generation of a High Density Plasma. The plasma is generated in a side chamber opening into the main process chamber, containing the target and the substrate to be coated. To enhance adhesion/prepare substrate, volatile contaminants on the substrate surface are removed, by directing the plasma beam onto the substrate. Prior to deposition, the target is sputter cleaned in a pure Ar plasma to remove oxides/contamination.

As the plasma is generated remotely, and not from the target itself (as in conventional magnetron sputtering), the ion current to the target is independent of the voltage applied to the target. This gives additional degrees of freedom to the growth process and allows new processes and structures to be developed.

Some other advantages could be presented such as:

- Multi-target and multi-substrates devices in the process chamber, allowing semi-continuous batch series and multi-layer deposition. We are developing a large area linear process with the same advantages as HiTUS for roll-to-roll or in-line processes.
- High Target Utilisation Sputtering, HiTUS: > 90% compared to <40 % for magnetron sputtering. No racetrack.
- Because there is no racetrack, poisoning of the target during reactive sputtering (such as SiN or SiO₂ deposition) is reduced. Pulsed DC and/or feedback control systems are not required. Therefore deposition rates for dielectric materials are up to ten times faster than for magnetron processes
- Possibility to deposit ferromagnetic films using thick ferromagnetic targets, (typically 6mm). We have sputtered from ferromagnetic targets >20mm thick.
- Film properties are independent of deposition rate
- Stress is controllable, from compressive to tensile, with zero stress in between.
- We can sputter onto thermally sensitive polymers such as PET/Kapton etc.
- Properties, such as refractive index and resistivity are close to bulk values
- Some examples of the materials sputtered to date are : Al₂O₃, Nb₂O₅, SiO₂, Ta₂O₅, TiO₂, ITO, SnO₂, Fe , Ni, Co, Cr, CrO₂, Al.

The applications:

- Information & Communication: Data Storage and retrieval, Fibre Optics, flat panel display
- Optics: Precision Optics, Ophthalmics
- Flexible Electronics (growth market estimated to be at \$30Bn by 2015): OLED's, Flexible Displays
- Aerospace: Cockpits, Space Mirrors
- Photovoltaics: Solar panels, Reflectors
- Semiconductors
- Thin and thick layers engineering
-

For a more exhaustive list and some pictures of plasmas go to our website (www.plasma-quest.com).