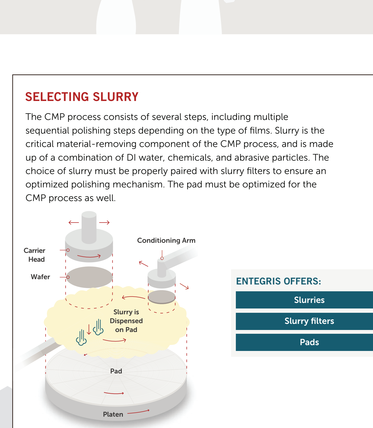
Finding CMP Synergies to Improve Wafer Performance, Yield, and Variability

Chemical Mechanical Planarization (CMP) is an enabler in device patterning and scaling and a critical determinant of wafer yield. It is more prevalent with newer chip architectures requiring novel materials and multiple CMP passes. The concept is simple: remove excess material and ensure a clean and planar surface for the next process step.

However, reducing defects becomes a growing challenge as the CMP steps evolve. Entegris has a uniquely comprehensive understanding of the CMP process steps and their critical interactions.

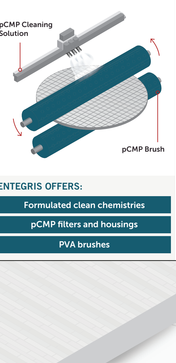
HOLISTIC CMP RESEARCH AND DEVELOPMENT

To develop a CMP solution that solves customers' challenges, scientists and process and tool engineers must consider the formulated slurries and clean chemistries, equipment and delivery systems, components, and filters.



SELECTING SLURRY

The CMP process consists of several steps, including multiple sequential polishing steps depending on the type of films. Slurry is the critical material-removing component of the CMP process, and is made up of a combination of DI water, chemicals, and abrasive particles. The choice of slurry must be properly paired with slurry filters to ensure an optimized polishing mechanism. The pad must be optimized for the CMP process as well.



ENTEGRIS OFFERS:

- Slurries
- Slurry filters
- Pads

CMP

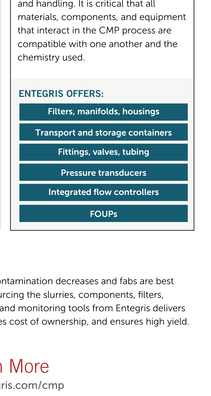
OPTIMIZING PCMP CLEAN TO SLURRY

After material removal and polishing, the wafer surface must be cleaned with contaminant-free, formulated clean chemistries and mechanical brushes. The selected chemistries must be optimized with the slurry. Brush material properties and design must also be considered.

ENTEGRIS OFFERS:

- Formulated clean chemistries
- pCMP filters and housings
- PVA brushes

PCMP CLEAN



ENSURING SLURRY CONSISTENCY

Slurry is subject to tight process control to ensure its integrity while in use, including particle size, flow rate, and chemical concentration monitoring. Particle filtration must also be tightly controlled to prevent both large particles that cause scratching, and small particles that can adhere to the surface and become difficult to remove in PCMP cleaning.

ENTEGRIS OFFERS:

- Electrochemical analyzer
- Particle count and size analyzers
- Concentration monitors
- Filters and housings

ENSURING CONTAMINATION CONTROL

Degradation and contamination must be minimized throughout slurry blending, storage, filtration, transport, and handling. It is critical that all materials, components, and equipment that interact in the CMP process are compatible with one another and the chemistry used.

ENTEGRIS OFFERS:

- Filters, manifolds, housings
- Transport and storage containers
- Fittings, valves, tubing
- Pressure transducers
- Integrated flow controllers
- FOUPs

PUTTING IT ALL TOGETHER

When the entire system works in sync, contamination decreases and fabs are best able to achieve their CMP yield goals. Sourcing the slurries, components, filters, chemistries, pads, conditioners, brushes, and monitoring tools from Entegris delivers the best on-wafer performance, decreases cost of ownership, and ensures high yield.

Learn More

www.entegris.com/cmp

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