Still Planar
After All These Years

Techcet CMP Consumables
2008 Market Update

Michael A. Fury, Ph.D.
Techcet Group LLC
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Techcet Group, LLC

MFury@Techcet.com
www.techcet.com
Outline

- The Business
- The Players
- The Buzz
- The End
The Business of CMP

- **Slurries** $1.0B
  - 3 year CAGR 0–20%
  - *Worth discussing some more?*

- **Pads** $600M
  - 3 year CAGR 9–18%

- **CMP Ancillaries** $300M
  - Pad Conditioners, Cu PCMP Cleaners, PVA Brushes (excludes filters & retaining rings)
Slurry Revenue Sources

- S-STI: 8%
- ILD: 16%
- Tungsten: 29%
- Cu step 1: 28%
- Cu barrier: 19%
How Might Slurries Stagnate?

3 year CAGR 0-20%?

- Slurry volumes grow with chip volumes
  - as expected
- Slurry costs are under a lot of pressure
  - as expected
- Fab engineers can do more about slurry costs than about other CMP consumable costs
Fab Engineers

Those Magnificent Men (and Women) in their Polishing Machines

- POU slurry dilution
  - 2:1 to 10:1
- Lower slurry flow rates
  - Remember the *Photoresist* Alamo!
Pads Holding Their Own

- Not as much specialization by CMP application
  - Diffuses focus
- Pad longevity increasing with kinder, gentler conditioning – or none at all
  - Defuses cost pressure
- Public opinion poll: same old same old
CMP Ancillaries

- Pad conditioners are the hotbed
  - New materials, new designs, new research
- Cu PCMP is still a growth market
  - W PCMP niches will grow below 45nm
  - S–STI PCMP showing signs of life
- PVA brushes – new names, new designs
- Filters – the quiet companies
- Retaining rings – new materials
The Players - Slurry

Tungsten

- Cabot 78%
- Fujimi 4%
- RHEM 2%
- Cheil 8%
- DA Nano 8%
The Players - Slurry

ILD

- Cabot 42%
- RHEM 30%
- Fujimi 12%
- Planar Sol'n 7%
- DA Nano 1%
- Other 9%

Cu Step 1

- Fujimi 23%
- DA Nano 23%
- Hitachi 14%
- JSR 10%
- Planar Sol'n 1%
- Cabot 13%
- RHEM 16%
The Players - Slurry

Cu Barrier

- Cabot 3%
- Fujimi 1%
- DA Nano 10%
- Hitachi 11%
- RHEM 16%
- JSR 18%
- Planar Sol'n 41%

S-STI

- Hitachi 77%
- Cabot 4%
- DA Nano 6%
- RHEM 4%
- Other 10%
- Planar Sol'n 41%
The Players - Pads

CMP Pads

- RHEM 84%
- Thomas West 5%
- JSR 5%
- Other 4%
- Cabot 3%
The Buzz – Big Biz

- Dow Chemical acquires Rohm & Haas Corporation for $18.8B July 10, 2008
The Buzz - Slurry

- Hitachi Chemical commands S–STI
- Planar Solutions – breakout leader in Cu barrier
- Five suppliers over 10% share in Cu step 1, two over 20%
- Cabot slurry overall revenue share is down to 35%, even with 78% of the W market
The Buzz - Pads

- Innopad & Cabot pads replacing RHEM for W; TWI share is holding
- JSR Cu step 1 pads used on AMAT
- Cabot Cu step 1 pads find home on Ebara
- Praxair ILD pads gaining as AMAT BKM
- NexPlanar – re–birth on July 10
The Buzz – The Biz

- Proprietary PCMP cleaners are alive and well, and getting better
  - Orphaned EKC & APCI PCMP products need a home
  - Cabot PCMP strategy undefined
- PVA brushes will live well through several more nodes
  - Molded-on-the-core may be the enabler
The Buzz – The Biz

- SEZ into Lam – PCMP in your future?
- Fixed abrasive pads have found a non-threatening niche
- Lam Teres – R.I.P.
- ECMP – R.I.P.
- Novellus CMP – resting in pieces
The End

- CMP growth is keeping pace with the semiconductor industry
  - Evolution, not revolution
- No threats to CMP status quo
- Suppliers and market shares will continue to shift over time, but CMP revenues will soar
Contact Techcet Group, LLC

- Lita Shon-Roy
  - 925-413-9373
  - LShonRoy@Techcet.com

- Michael A. Fury
  - 415-395-6945
  -MFury@Techcet.com