

Table of Contents

No.	Title	Page No.
Cu-Chemical Mechanical Polishing		
1	Abrasive Particle Effect on the Planarization of Cu Film - S. Chang, I. Butch, G. Banerjee, D. Tamboli, M. Waddel, and S. Hymes.	1
2	Post-CMP Challenges for Cu-Low K Integration - D. Tamboli, G. Banerjee, M. Waddell, J. Listebarger, Q. Arefeen, and S. Hymes.	10
3	Effect of Additives in Post Cu CMP Cleaning Solutions on Particle Adhesion and Removal - Y.K. Hong, D.H. Eom, S.H. Lee, J.G. Park, and A.A. Busnaina	19
4	The Role of Chemical Components in Copper CMP Slurries - Y. Luo, T. Du, and V. Desai	27
5	Comparison of Copper Disc and Copper Wafer Polishing Processes in Terms of their Kinetic, Tribological - Z. Li, S. Rader, P. Lefevre, K. Ina, and A. Philipossian.	35
6	Electrochemical and Frictional Behaviors of Cu Surface in Organic Acid Based Slurries During Copper CMP - D.-H. Eom, J.-S. Ryu, Y.-K. Hong, J.-J. Myung, K.-S. Kim, and J.-G. Park	44
Metal-Chemical Mechanical Polishing		
7	Chemical-mechanical Planarization of Copper: Role of Oxidants and Inhibitors - S. Kuiry, S. Deshpande, Y. Obeng, and S. Seal	52
8	Heating and Convection in Copper Polishing - L. Borucki, Z. Li, and A. Philipossian	61
9	Electrochemical Aspects of Copper Chemical Mechanical Planarization (CMP) in Peroxide Based Slurry - Y. Ein-Eli, E. Abelev, and D. Starovetsky	68
10	Copper Chemical Mechanical Planarization Processes in Carbon Dioxide - G. Denison, P. Visintin, C. Bessel, R. Murray, and J. DeSimone	76
11	Colloids and Surfaces in Chemical Mechanical Polishing: An Adsorptive Model for Abrasive Particle/Oxide Substrate Interactions - K. Osseo-Asare	83
12	Determining the Effects of Slurry Surfactant, Abrasive Size and Content on the Tribology and Kinetics of Copper CMP - Z. Li, K. Ina, P. Lefevre, and A. Philipossian.	92
13	Determining the Effect of Slurry Flow Rate on the Tribological, Thermal and Removal Rate Attributes of Copper CMP - Z. Li, L. Borucki, and A. Philipossian.	104
14	Effect of Oxidizer on Copper And Tantalum in Copper CMP - D.-W. Lee, N.-H. Kim, S.-Y. Kim, T.-H. Kim, and E.-G. Chang	115
15	Optimization by Concentration of Oxidizer and Complexing Agent in Cu CMP Slurry - I.-P. Kim, N.-H. Kim, J.-H. Lim, S.-Y. Kim, and E.-G. Chang	121
CMP Consumables		
16	Surface Modifications for Enhanced Performance on Psiloquest's Application Specific Pads for Chemical Mechanical Planarization - Y. Obeng, S. Deshpande, S.C. Kuiry, S. Dakshinamurthy, K. Chamma, R. Vaidyanathan, K. Richardson, S. Seal.	127
17	In-situ Recycle of Used Oxide Slurry for Production - J.G. Park, K.J. Lee, and M.S. Kim	139
18	Fixed Abrasive Direct STI CMP Allows Elimination of the Conventional Subpad Compromise for Edge NU and WID Ranges - J. Gagliardi	149
19	Impact of CMP Consumables on Copper Metallization Reliability - Y. Obeng	156
20	Effect of Novel Pad Groove Designs on the Frictional and Removal Rate Characteristics of ILD CMP - D. Rosales-Yeomans, T. Doi, M. Kinoshita, and A. Philipossian.	166

21	Analysis of Frictional Heating of Grooved and Flat CMP Polishing Pads - L. Borucki, L. Charns, and A. Philipossian	174
22	Evaluation of Mechanical Quality of CMP Pads Using Acoustic Techniques - P. Zantye, A. Sikder, A. Kumar, A. Belyaev, I. Tarasov, J. Harmon and S. Ostapenko	183
23	Effect of Slurry Characteristics on Nanotopography Impact in Chemical Mechanical Polishing - T. Katoh, S.-J. Kim, U. Paik, and J.-G. Park	191
24	Colloidal Aspects of CMP - T. Gopal and J. Talbot	200
25	Study of PH and Down Pressure Effects on Silicon Dioxide Dielectric Chemical Mechanical Polishing (CMP) - W. Choi, S.-M. Lee, and R. Singh	208
26	Effects of Abrasive Morphology and Surfactant in Nano-Ceria Slurry for Shallow Trench Isolation Chemical Mechanical Polishing - H.-G. Kang, T. Katoh, W.-M. Lee, U. Paik, and J.-G. Park	216
27	The Spectral Fingerprints and the Sounds of CMP - D. Rosales-Yeomans, T. Doy, and A. Philipossian	224

CMP Characterization – Detection, Modeling, Electrical and Mechanical Characterization

28	Post-CMP Defect Detection: Set-up and Validation of a Recipe for Laser Surface Scanning Systems - D. Lodi, D. Caputo, and G. Lorenzi	236
29	Electrochemical Characterization of Copper and Tantalum Chemical Mechanical Planarization - J. Liu, M. King, M. Darsillo, and T. Baum	248
30	Tribological and Removal Rate Characterization of Colloidal Silica ILD CMP Processes- M. Sugiyama, D. King, L. Charns, J. Degraffenreid, H. Nguyen-Ngoc, and A. philipossian	261
31	Analytical and Functional Characterization of Recycled Fumed Silica Slurries in ILD CMP - P. Levy, S. Rader, P. Lefevre, K. Ina, F. Shadman, M. Sugiyama, and A. Philipossian	270
32	RTP Process to Reduce NMOS to PMOS Isolation Step Height Delta - A. Khoueir, M. Khouri, A. Zagrebelsky, I. Sen, J. Fulford, and D. Arnzen	277
33	Study of Over-polishing at the Edge of a Pattern in Selective CMP – J.-H. Park, D.-W. Park, J.-D. Lee, C. Hong, W.-S. Han, and J.-T. Moon.	288
34	Characterization of the Chemical Interactions on Copper Chemical Mechanical Polishing (CMP) - S.-M. Lee, J. Abiade, W. Choi, and R. Singh	295
35	Combining a Finite Element Model and a Removal Model to Evaluate the Effect of Wafer and Pad Shape on Removal in CMP. - J. McGrath and C. Davis	305
36	Modeling Dielectric Erosion in Multi-Step Copper Chemical-Mechanical Polishing - K. Noh, N. Saka, and J.-H. Chun	313
37	Statistical Validation of a RTDC Algorithm for Shallow Trench Isolation Post-CMP Micro-scratch Detection and Classification Using a Laser Scanning Surface System - D. Lodi, D. Caputo, and G. Lorenzi	326
38	Tungsten CMP: Application of Mixed Potential Theory to the Tungsten/Iodates System- M. Anik and K. Osseo-Asare	335
39	Copper Electroplating: Effects on Chemical Mechanical Planarization David Merricks	349
	Author Index	354
	Subject Index	356