

JAPANESE JOURNAL OF APPLIED PHYSICS

Volume 49, Number 5, May 2010 [Issue 3 of 3]

Special Issue: Advanced Metallization for ULSI Applications

Metals and barriers

- 05FA01 **Restraint of Copper Oxidation Using Barrier Restoration Technique with Cu-Mn Alloy** (4 pages)
Masaki Haneda, Nobuyuki Ohtsuka, Hiroshi Kudo, Takahiro Tabira, Michie Sunayama, Noriyoshi Shimizu, Hiroshiro Ochimizu, Atsuhiko Tsukune
- 05FA02 **Selective Formation of a SnO₂ Cap Layer, Its Growth Behavior, and Oxidation Resistance** (4 pages)
Yoshihito Fujii, Junichi Koike, Yuji Sutou, Zifeng Li, Koji Neishi
- 05FA03 **Copper-Holmium Alloy Film for Reliable Interconnects** (4 pages)
Chon-Hsin Lin, Wen-Kuan Leau, Cheng-Hui Wu
- 05FA04 **A 3 nm Self-Forming InO_x Diffusion Barrier for Advanced Cu/Porous Low-k Interconnects** (4 pages)
Dung-Ching Perng, Kuo-Chung Hsu, Jia-Bin Yeh
- 05FA05 **Evolution of Microstructures in Nanocrystalline VN Barrier Leading to Failure in Cu/VN/SiO₂/Si Systems** (5 pages)
Mayumi B. Takeyama, Takaomi Itoi, Atsushi Noya
- 05FA06 **Reactively Sputtered Nanocrystalline ZrN Film as Extremely Thin Diffusion Barrier between Cu and SiO₂** (4 pages)
Mayumi B. Takeyama, Masaru Sato, Eiji Aoyagi, Atsushi Noya
- 05FA07 **Initial Cu Growth in Cu-Seeded and Ru-Lined Narrow Trenches for Supercritical Fluid Cu Chemical Deposition** (5 pages)
Eiichi Kondoh, Masahiro Matsubara, Kakeru Tamai, Yukihiro Shimogaki
- 05FA08 **Grain Growth Enhancement of Electroplated Copper Film by Supercritical Annealing** (6 pages)
Kazuyoshi Ueno, Yuji Shimada, Shigeru Yomogida, Seishi Akahori, Tomohiko Yamamoto, Takamasa Yamaguchi, Yoshinoji Aoki, Akiko Matsuyama, Takashi Yata, Hideki Hashimoto
- 05FA09 **Formation of Palladium Silicide on Heavily Doped Si(001) Substrates Using Ti Intermediate Layer** (5 pages)
Risa Suryana, Osamu Nakatsuka, Shigeaki Zaima
- 05FA10 **Plasma-Enhanced Atomic Layer Deposition of Cobalt Using Cyclopentadienyl Isopropyl Acetamidinato-Cobalt as a Precursor** (5 pages)
Jae-Min Kim, Han-Bo-Ram Lee, Clement Lansalot, Christian Dussarrat, Julien Gatineau, Hyungjun Kim
- 05FA11 **Plasma-Enhanced Atomic Layer Deposition of Ni** (4 pages)
Han-Bo-Ram Lee, Sung-Hwan Bang, Woo-Hee Kim, Gil Ho Gu, Young Kuk Lee, Taek-Mo Chung, Chang Gyoun Kim, Chan Gyung Park, Hyungjun Kim
- 05FA12 **Effects of Water Desorption from SiO₂ Substrates on the Thickness of Manganese Oxide Diffusion Barrier Layer Formed by Chemical Vapor Deposition** (2 pages)
Kenji Matsumoto, Koji Neishi, Hitoshi Itoh, Hidenori Miyoshi, Hiroshi Sato, Shigetoshi Hosaka, Junichi Koike

Dielectric materials

- 05FB01 **Stress Modulation of Silicon Nitride Film by Initial Deposition Conditions for Transistor Carrier Mobility Enhancement** (4 pages)
Jingze Tian, Biao Zuo, Wei Lu, Meisheng Zhou, Liang Choo Hsia
- 05FB02 **Integration of Photo-Patternable Low-κ Material into Advanced Cu Back-End-Of-The-Line** (2 pages)
Qinghuang Lin, Alshakim Nelson, Shyng-Tsong Chen, Philip Brock, Stephan A. Cohen, Blake Davis, Richard Kaplan, Raneer Kwong, Eric Liniger, Debra Neumayer, Jyotica Patel, Hosadurga Shobha, Ratnam Sooriyakumaran, Sampath Purushothaman, Robert Miller, Terry Spooner, Robert Wisniew

Planarization technology

- 05FC01 **End-Point Detection of Ta/TaN Chemical Mechanical Planarization via Forces Analysis** (4 pages)
Yasa Sampurno, Xun Gu, Takenao Nemoto, Yun Zhuang, Akinobu Teramoto, Ara Philipossian, Tadahiro Ohmi
- 05FC02 **Cu Dual-Damascene Interconnects with Direct Chemical Mechanical Polishing Process on Porous Low-k Film** (4 pages)
Junko Izumitani, Daisuke Kodama, Shigenori Kido, Hiroyuki Chibahara, Yoshihiro Oka, Kinya Goto, Naohito Suzumura, Masahiko Fujisawa, Hiroshi Miyatake

(Continued on third cover)

(Continued)

- 05FC03 **Fundamental Study of Chemical-Mechanical Polishing Slurry of Cobalt Barrier Metal for the Next-Generation Interconnect Process** (2 pages)
Hideaki Nishizawa, Haruki Nojo, Akira Isobe

Process integration issues

- 05FD01 **Performance of Cu Dual-Damascene Interconnects Using a Thin Ti-Based Self-Formed Barrier Layer for 28 nm Node and Beyond** (4 pages)
Kazuyuki Ohmori, Kenichi Mori, Kazuyoshi Maekawa, Kazuyuki Kohama, Kazuhiro Ito, Takashi Ohnishi, Masao Mizuno, Koyu Asai, Masanori Murakami, Hiroshi Miyatake
- 05FD02 **Trench Sidewall Elimination Effect on Line-to-Line Leakage Current in Scalable Porous Silica ($k = 2.1$)/Cu Interconnect Structure** (8 pages)
Akifumi Gawase, Shinichi Chikaki, Naofumi Nakamura, Eiichi Soda, Noriaki Oda, Shuichi Saito
- 05FD03 **Integration of Progen-Based Low- k Films: Influence of Capping Layer Thickness and Long Thermal Anneals on Low- k Damage and Reliability** (4 pages)
David De Roest, Bart Vereecke, Craig Huffman, Nancy Heylen, Kristof Croes, Hirofumi Arai, Noboru Takamura, Julien Beynet, Hessel Sprey, Kiyohiro Matsushita, Nobuyoshi Kobayashi, Patrick Verdonck, Steven Demuyne, Gerald Beyer, Zsolt Tokel, Herbert Struyf
- 05FD04 **High-Etching-Selectivity Barrier SiC ($k < 3.5$) Film for 32-nm-Node Copper/Low- k Interconnects** (8 pages)
Junya Nakahira, Shuji Nagano, Akifumi Gawase, Yoshi Ohashi, Hideharu Shimizu, Shinichi Chikaki, Noriaki Oda, Seiichi Kondo, Satoshi Hasaka, Shuichi Saito

Reliability science and failure analysis

- 05FE01 **Statistical Analysis of Lifetime Distribution of Time-Dependent Dielectric Breakdown in Cu/Low- k Interconnects by Incorporation of Overlay Error Model** (4 pages)
Shinji Yokogawa, Hideaki Tsuchiya
- 05FE02 **Photoinduced Leakage Currents in Silicon Carbon Nitride Dielectrics for Copper Diffusion Barriers** (6 pages)
Kiyoteru Kobayashi, Taketoshi Ide

Sciences in process and characterization

- 05FF01 **Step Coverage Quality of Cu Films by Supercritical Fluid Deposition Compared with Chemical Vapor Deposition** (6 pages)
Takeshi Momose, Masakazu Sugiyama, Eiichi Kondoh, Yukihiro Shimogaki
- 05FF02 **Novel Precursor for Development of Si-C₂H₄-Si Networks in SiCH for Application as a Low- k Cap Layer beyond 22 nm Nodes** (5 pages)
Hideharu Shimizu, Nobuo Tajima, Takeshi Kada, Shuji Nagano, Yoshi Ohashi, Satoshi Hasaka
- 05FF03 **Proposal of New Precursors for Plasma-Enhanced Chemical Vapor Deposition of SiOCH Low- k Films with Plasma Damage Resistance** (5 pages)
Yoshi Ohashi, Nobuo Tajima, Yonghua Xu, Takeshi Kada, Shuji Nagano, Hideharu Shimizu, Satoshi Hasaka
- 05FF04 **Effect of Pattern Layout and Dissolved Oxygen in CO₂ Rinse Water on Cu Corrosion during Post-Etch Cleaning** (5 pages)
Kentaro Tokuri, Yukinari Yamashita, Morio Shiohara, Noriaki Oda, Seiichi Kondo, Shuichi Saito
- 05FF05 **Analysis on Copper Photocorrosion Induced by Illuminance in Chemical Mechanical Planarization Equipment Using Photodiode and Quartz Crystal Microbalance** (6 pages)
Shohei Shima, Yutaka Wada, Katsuhiko Tokushige, Akira Fukunaga, Manabu Tsujimura
- 05FF06 **Chemical Vapor Deposition of GeSbTe Thin Films for Next-Generation Phase Change Memory** (2 pages)
Hideaki Machida, Seichi Hamada, Takafumi Horiike, Masato Ishikawa, Atsushi Ogura, Yoshio Ohshita, Takayuki Ohba

3D and packaging technology

- 05FG01 **Hybrid Electrochemical Mechanical Planarization Process for Cu Dual-Damascene Through-Silicon Via Using Noncontact Electrode Pad** (5 pages)
Shigeru Tominaga, Daisuke Abe, Taro Enomoto, Seiichi Kondo, Hideki Kitada, Takayuki Ohba
- 05FG02 **Radio Frequency Micro Electro Mechanical Systems Inductor Configurations for Achieving Large Inductance Variations and High Q-factors** (3 pages)
Yutaka Mizuochi, Shuhei Amakawa, Noboru Ishihara, Kazuya Masu
- 05FG03 **Stress Analysis for Chip-Package Interaction of Cu/Low- k Multilayer Interconnects** (4 pages)
Yukihiro Kumagai, Hiroyuki Ohta, Masahiko Fujisawa, Takeshi Iwamoto, Akihiko Ohsaki

Japanese Journal of Applied Physics Vol. 49, No. 5 (2010) 増刊号

発行 社団法人 応用物理学会 〒102-0073 東京都千代田区九段北1丁目12番3号 井門九段北ビル 電話 03-3238-1041
印刷 小宮山印刷工業株式会社 〒162-0808 東京都新宿区天神町78番地 電話 03-3260-5211
2010年5月25日発行 国内定価 3600円 年額 180000円 (JJAP & APEX)
正会員学会会員の購読料はJJAP付加会費として各学会の会費に含む。