ALBENA PASKALEVA DOTCHEVA

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Education:

1999 - PhD in Solid State Physics;
1991 - Graduated in Physics, Department of Solid State Physics, Sofia University „St. Kliment Ohridski";
1986 – Secondary School of Mathematics, Plovdiv, Bulgaria.

Scholarships:

- University of Erlangen-Nuernberg, Erlangen, Germany, 2002, 12 months - Fellow of the Alexander von Humboldt Foundation
- University of Erlangen-Nuernberg, Erlangen, Germany, 2010, 3 months. - Fellow of the Alexander von Humboldt Foundation

Scientific research fields:

- Physics, technology, electrical and structural properties of dielectric layers, alternative high-k gate dielectrics for micro- and nanoelectronic applications;
- electrically active defects in thin dielectric/Si structures; conduction mechanisms in dielectric layers;
- emerging non-volatile memories (phenomena, concepts, materials, technology, characterisation);
- electronic and optical properties of semiconductor materials and nanostructures
- CMOS and beyond CMOS nanoelectronics
- gas sensors

Member of Editorial Board of:

- Materials Science in Semiconductor Processing, Elsevier;
- Microelectronics Reliability, Elsevier;
- Guest Editor of Special Topical Issue "Advanced oxides for Electronics", Materials Science in Semiconductor Processing, 16(5) (2013)

Albena Paskaleva is the author and co-author of more than 130 publications in journals with impact factor and proceedings of international conferences, including 14 invited papers/talks and 4 book's chapters.

Selected Publications:

M. Rommel, A. Paskaleva, *Investigation of high-k dielectric stacks by C-AFM: advantages, limitations and possible applications*", Chapter 4, in "Conductive Atomic Force Microscopy: Application in nanomaterials", ed. M. Lanza, Wiley VCH, (2017)

D. Spassov, A. Paskaleva, E. Guziewicz, G. Luka, T. A. Krajewski, K. Kopalko, A. Wierzbicka, B. Blagoev, *Electrical characteristics of multilayered HfO_2 – Al_2O_3 charge trapping stacks deposited by ALD*, J. Phys.:Conf. Series 764 (2016) 012016

A. Paskaleva, M. Rommel, A. Hutzler, D. Spassov, A.J. Bauer, *"Tailoring the Electrical Properties of HfO_2 MOS-Devices by Aluminum Doping"*, ACS Applied Materials and Interfaces, 7(31) (2015) 17032-17043;

A. Paskaleva, W. Weinreich, A. J. Bauer, M. Lemberger, L. Frey, *"Improved electrical behavior of ZrO_2-based MIM structures by optimizing the O_3 oxidation pulse time"*, Mater. Sci. Semicond. Proc. 29 (2015) 124-131.

K. Murakami, M. Rommel, B. Hudec, A. Rosová, K. Hušeková, E. Dobročka, R. Rammula, A. Kasikov, J.-H. Han, W. Lee, S.- J. Song, A. Paskaleva, A. J. Bauer, L. Frey, K. Fröhlich, J. Aarik, and Ch.-S. Hwang, *"Nanoscale Characterization of TiO_2 Films Grown by Atomic Layer Deposition on RuO_2 Electrodes*", ACS Applied Materials and Interfaces, 6(4) (2014) 2486–2492.

B. Hudec, A. Paskaleva, P. Jančovič, J. Dérer, J. Dérer, A. Rosová, E. Dobročka, and K. Fröhlich, , *Resistive switching in TiO_2-based MIM structures with Al_2O_3 barrier layer at the metal/dielectric interface*, oral presentation at E-MRS 2013, Strasbourg, Thin Solid Films, 563 (2014) 10-14

A. Paskaleva, B. Hudec, P. Jančovič, K. Fröhlich, D. Spasov, *The influence of technology and switching paramaters on resistive switching behavior of TiN/HfO_2/Pt MIM structures,* Facta Universitatis,Series: Electronics and Energetics, 27(4) (2014), pp. 621 – 630

W. Weinreich, A. Shariq, K. Seidel, J. Sundqvist, A. Paskaleva, M. Lemberger, A. Bauer *„Detailed leakage current analysis of MIM capacitors with ZrO_2, ZSZ and ZAZ as dielectric and TiN electrodes"*, WODIM, Dresden, 2012, J. Vac. Sci. Technol. B. 31(1) (2013) 01A109

E. Atanassova, A. Paskaleva, D. Spassov, *"Doped Ta_2O_5 and mixed HfO_2-Ta_2O_5 films for dynamic memories application"*, Microelectron. Reliab. 51, 642-50 (2012), invited paper.

A. Paskaleva, M. Lemberger, A.J. Bauer, L. Frey, *"Implication of oxygen vacancies on current conduction mechanisms in TiN/$Zr_{1-x}Al_xO_2$/TiN MIM structures",* J. Appl. Phys.109 (2011) 076101.

A. Paskaleva, M. Lemberger, E. Atanassova, A. J. Bauer, "Traps and trapping phenomena and their implemantations on electrical behavior of high-*k* capacitor stack", Invited lecture, 16th Workshop on Dielectrics in Microel. WODIM'2010, June 2010, Bratislava, Slovakia; J. Vac. Sci. Technol. 29(1) (2011) 01AA03

M. Tapajna, A. Paskaleva, E. Atanassova, E. Dobrocka, K. Husekova, K. Frohlich, "*Gate oxide thickness dependence of the leakage current mechanism in Ru/Ta_2O_5/SiON/Si structures",* Semicond. Sci. Technol. 25 (2010) 075007

M. Rommel, V. Yanev, A. Paskaleva, T. Erlbacher, M. Lemberger, A. Bauer and L. Frey "*Electrical Scanning Probe Microscopy Techniques for the Detailed Characterization of High-k Dielectric Layers",* invited lecture, 217th ECS Meeting in Vancouver, BC, Canada; ECS Transactions 28(2) (2010) 139-156.

A. Paskaleva, M. Lemberger, A. J. Bauer, W. Weinreich, J. Heitmann, E. Erben, U. Schröder, L. Oberbeck *"Influence of the amorphous/crystalline phase of $Zr_{1-x}Al_xO_2$ high-k layers on the capacitance performance of MIM stacks"*, J. Appl. Phys. 106 (2009) 054107.

V. Yanev, M. Rommel, M. Lemberger, S. Petersen, B. Amon, T. Erlbacher, A. J. Bauer, H. Ryssel, A. Paskaleva, W. Weinreich, C. Fachmann, J. Heitmann, and U. Schroeder "*Tunneling atomic-force microscopy as a highly sensitive*

mapping tool for the characterization of film morphology in thin high-k dielectrics", Appl. Phys. Lett. 92, 252910 (2008).

A. Paskaleva, V. Yanev, M. Rommel, M. Lemberger, A. J. Bauer, "*Improved insight in charge trapping of high-k ZrO_2/SiO_2 stacks by using tunneling atomic force microscopy",* J.Appl.Phys. 104 (2008) 024108.

E. Atanassova, A. Paskaleva*, "Challenges of Ta_2O_5 as high-k dielectric for nanoscale DRAMs"*, Introductory invited paper, Microel. Reliab. 47 (2007) 913-23.

A. Paskaleva, M. Lemberger, A.J. Bauer *"Stress induced leakage current mechanism in thin Hf-silicate layers",* Appl. Phys. Lett. 90 (4) (2007) 042105

A. Paskaleva, E. Atanassova, M. Lemberger, A.J. Bauer *"Correlation between defects, leakage currents and conduction mechanisms in thin high-k dielectric layers",* (Invited lecture) NATO Advance Research Workshop on Defects in High-K dielectrics, St.Petersburg, Russia, 11-14 July, 2005: published in: "Defects in High-K dielectric stacks", ed. E. Gusev, Springer, 2006 pp.411-422.

A. Paskaleva, A.J. Bauer, M. Lemberger, *An asymmetry of conduction mechanisms and charge trapping in thin high-k $Hf_xTi_ySi_zO$ films,* J. Appl. Phys. 98(5) (2005) 053707 (8 pages) IF=2.21 (DSc)

A.Paskaleva, R.R. Ciechonski, M. Syväjärvi, E. Atanassova, and R. Yakimova, *Electrical behavior of 4H-SiC MOS Structures with Al_2O_3 as Gate Dielectric,* J. Appl. Phys. 97(12) (2005) 124507 (4 pages).

A.Paskaleva, A.J. Bauer, M. Lemberger, S. Zürcher, *Different current conduction mechanisms through thin high-k $Hf_xTi_ySi_zO$ films due to the varying Hf to Ti ratio,* J. Appl. Phys., 95 (10) (2004) 5583-5590