

**Igor O. Usov**  
Los Alamos National Laboratory  
Materials Science and Technology Division  
Engineered Materials Group

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**EDUCATION:**

- Jul'99 – Aug'02      **Ph.D. program in Applied and Materials Science**  
University of North Carolina, Chapel Hill
- Sep'85 – Feb'93      **M.S. program in Physics**  
St.Petersburg State Technical University, St.Petersburg, Russia

**EXPERIENCE:**

- Oct'10 – present      **Team Leader**, Los Alamos National Laboratory, Thin Films and Coatings Team
- Physical and chemical vapor deposition of coatings and thin films
  - Fabrication and characterization of depleted uranium oxide films
  - Surface Probe Microscopy of Pu and actinide compounds
- Feb'06 – Oct'10      **Technical Staff Member**, Los Alamos National Laboratory, Ion Beam Materials Laboratory
- Radiation damage effects in various materials
  - Chemical composition measurements by ion beam analysis techniques.
  - Development of ion implantation, ion beam analysis and ion irradiation capabilities.
  - Operation and maintenance of NEC Tandem accelerator and Varian ion implanter
- Jan'03 – Feb'06      **Postdoctoral Associate**, Los Alamos National Laboratory, Superconductivity and Technology Center
- Development and optimization of buffer layer architecture for 2<sup>nd</sup> generation high temperature superconducting wires.
- Jan'99 – Dec'02      **Teaching/Research Assistant**, University of North Carolina at Chapel Hill
- Ion implantation and annealing of GaN.
  - Taught Physics laboratory classes for graduate and undergraduate students.
  - Operated and maintained 200 keV ion implanter (Eaton NV 3204).
- Apr'93 – Jun'98      **Research Scientist**, A.F. Ioffe Physical-Technical Institute of Russian Academy of Sciences, St. Petersburg, Russia
- Ion implantation effects (doping, microstructural changes, diffusion) in SiC single crystals.
  - Formation of electrically conducting layers in ion implanted polyaniline.
  - Fabrication and characterization of high temperature superconducting films.

## SELECTED PUBLICATIONS:

1. M. Beaux, M. Santiago Cordoba, A. Zocco, D. Vodnik, M. Ramos, S. Richmond, D. Moore, T. Venhaus, S. Joyce, I. Usov, "Development of First Ever Scanning Probe Microscopy Capabilities for Plutonium", *J. Nucl. Mater.*, 487 (2017) 260
2. I.O. Usov, R.M. Dickerson, P.O. Dickerson M.E. Hawley, D.D. Byler, K.J. McClellan, "Uranium dioxide films with xenon filled bubbles for fission gas behavior studies", *J. Nucl. Mater.* 452 (2014) 173
3. I.O. Usov, R.M. Dickerson, P.O. Dickerson M.E. Hawley, D.D. Byler, K.J. McClellan, "Thin uranium dioxide films with embedded xenon", *J. Nucl. Mater.* 437 (2013) 1
4. I.O. Usov, D.J. Devlin, J.A. Valdez, J. Won, "Ion irradiation temperature effect on HfO<sub>2</sub>/MgO multi-layer structures" *J. Nucl. Mater.* 420 (2012) 262
5. I.O. Usov, D.J. Devlin, J.A. Valdez, J. Won, A. Kossoy, Y.Q. Wang, K.E. Sickafus, "Medium energy ion irradiation capability for studies of radiation damage effects over a wide temperature range", *Nucl. Instr. Meth. B* 269 (2011) 2734.
6. I.O. Usov, J.A. Valdez, K.E. Sickafus, "Temperature dependence of lattice disorder in Ar-irradiated (100), (110) and (111) MgO single crystals", *Nucl. Instr. Meth. B* 269 (2011) 288.
7. I.O. Usov, J. Won, D.J. Devlin, Y.-B. Jiang, J.A. Valdez, K.E. Sickafus "A novel method for incorporating fission gas elements into solids", *J. Nucl. Mater.* 408 (2011) 205.
8. M. E. Hawley, D.J. Devlin, C.J. Reichhardt, K.E. Sickafus, I.O. Usov, J.A. Valdez, and Y.Q. Wang "AFM Characterization of Model Nuclear Fuel Oxide Multilayer Structures Modified by Heavy Ion Beam Irradiation", *Nucl. Instr. Meth. B* 268 (2010) 3269
9. N.A. Suvorova, I.O. Usov, L. Stan, R.F. DePaula, A.M. Dattelbaum, Q. X. Jia, A.A. Suvorova, "Structural and optical properties of ZnO thin films by rf magnetron sputtering with rapid thermal annealing", *Appl. Phys. Lett.* 92 (2008) 141911.
10. Stan L., Arendt P.N., Wang H., Foltyn S.R., Holesinger T.G., Maiorov B., Civale L., Usov I.O., Groves J.R., DePaula R.F., " Study of Sm<sub>x</sub>Zr<sub>1-x</sub>O<sub>y</sub> buffer layer and its effects on YBCO properties", *IEEE Transactions on Applied superconductivity* 17 (2007) 3409.
11. Groves J.R., Arendt P.N., Holesinger T.G., Depaula R.F., Stan L., Usov I.O., Hammond R.H., "Dual ion assist beam processing of magnesium oxide template layers for 2<sup>nd</sup> generation coated conductors", *IEEE Transactions on Applied superconductivity* 17 (2007) 3402.
12. L. Stan, P.N. Arendt, I.O. Usov, H. Wang, S.R. Foltyn, B. Maiorov, J.R. Groves, R.F. DePaula, Y. Li "Engineered reactive cosputtered Sm<sub>x</sub>Zr<sub>1-x</sub>O<sub>y</sub> thin films as buffer layers for YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-δ</sub> coated conductors" *Journal of Materials Research* 22(4) (2007) 1082.
13. L. Stan, P.N. Arendt, R.F. DePaula, I.O. Usov, J. R. Groves, "Effect of substrate temperature on the texture of MgO films grown by ion beam assisted deposition", *Superconductor Science & Technology* 19 (2006) 365.
14. P.N. Arendt, S.F. Foltyn, L. Civale, R.F. DePaula, P.C. Dowden, J.R. Groves, T.G. Holesinger, Q.X. Jia, S. Kreiskott, L. Stan, I. Usov, H. Wang, J.Y. Coulter, "High critical current YBCO coated conductors based on IBAD MgO", *Physica C* 412-414 (2004) 795.
15. I. Usov, P. Arendt, R. DePaula, H. Wang, S. Foltyn, P. Dowden, "Characteristics of alumina diffusion barrier films on Hastelloy", *Journal of Materials Research* 19 (2004) 1175.