

CURRICULUM VITAE

ASHOK KUMAR, Ph.D.
Associate Professor of Materials Science and Engineering
Department of Mechanical Engineering, and
Nanomaterials and Nanomanufacturing Research Center (NNRC)
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EDUCATION

- 1992 **Ph.D.** *Major:* Materials Science and Engineering, *Minor:* Electrical Engineering (VLSI Technology); **North Carolina State University**, Raleigh
- 1988 **M.Tech.** Metallurgical Engineering, **Indian Institute of Technology** (IIT), Kanpur; INDIA
- 1985 **B.Tech.** Metallurgical Engineering, **Indian Institute of Technology** (IIT), Kanpur; INDIA

PROFESSIONAL EXPERIENCE

- 2000- Present **Associate Professor (*Tenured 2002*)**, Department of Mechanical Engineering, and Nanomaterials and Nanomanufacturing Research Center (NNRC), University of South Florida, Tampa
- 2002 (Dec) **Visiting Scientist**, Nagaoka University of Technology, Nagaoka
- 2000-2001: **Adjunct Professor**, Department of Electrical and Mechanical Engineering, University of South Alabama
- 1994-2001 **Cluster Director**, Alabama NASA EPSCoR (Advanced Materials)
- 2000 (Dec) **Visiting Scientist**, Nagaoka University of Technology, Nagaoka
- 1993-1999 **Assistant Professor**, Department of Electrical and Computer Engineering, University of South Alabama
- 1992-1993 **Research Associate Professor**, Department of Electrical and Computer Engineering, University of South Alabama
- 1985-1986 **Research Scientist**, Indian Institute of Technology, Kanpur; INDIA

AWARDS AND HONORS

- Recipient of “NSF Faculty Early Career Development (**CAREER**) Award”
- President’s Award for Faculty Excellence

- DOE EPSCoR Young Investigator Award
- NSF EPSCoR Young Investigator Award
- National Research Council Twining Fellowship Award
- National Engineering Honor Society (Tau Beta Pi)
- Sigma Xi (The Scientific Research Society)
- International Metallurgical Honor Society (Alpha Sigma Mu)

RESEARCH INTERESTS

- Microelectronics technology and fabrication
- Laser and plasma assisted of processing, characterization, and device technologies of electronic, ferroelectric, magnetic, high-Tc and polymeric thin films
- Processing and characterization of nanocrystalline materials
- Synthesis and applications of biosensor and biomaterials
- Structure-property relationship (electrical, mechanical, magnetic) in thin films
- Analytical characterization techniques of surfaces and thin films

RESEARCH GRANTS

University of South Florida (2000-Present)

- NSF ‘CAREER’: A Faculty Early Career Program in Development of Superhard Coatings for Improved Performances” (\$220,000) 2000-2005
- NSF DMII “ Novel Synthesis and Fabrication of Hybrid Coatings for Manufacturing Applications” (\$ 225,362) 2000-2003
- Florida Space Research Program, “Synthesis and Characterization of Engineered Nanostructured Materials with Laser Assisted Methods” (\$ 15,000) 2000-2001
- Florida High Tech. I-4 Corridor Program, “Evaluation of Mechanical Properties of Hard Coatings for Multifunctional Applications” (\$22,363) 2000-2001
- NSF CAREER Supplemental Award “A Faculty Early Career Program in Development of Superhard Coatings for Improved Performances” (Total \$297,660) 2001-2005
- Sematech, “Evaluation of Mechanical and Tribological Properties of Low-k Dielectric Materials” (\$171,984) 2001-2002
- Florida High Tech. I-4 Corridor, “A Smart Composite for Microelectronics Thermal Management Applications” (\$50,000) 2001-2002
- Florida High Tech. I-4 Corridor, “Evaluation of Mechanical and Tribological Properties of PVD Hard Coatings for Multifunctional Applications” (\$36,000) 2001-2002

- NSF GK-12 Fellowship, “University of South Florida: Students, Teachers, and Resources in the Sciences” PI: Geoffrey Okogbaa and Co-PIs: A. Kumar et. al. (\$1,530,000) 2002-2005
- NSF MRI, “Acquisition of a Transmission Electron Microscope for Research and Education” (\$738,646) 2002-2005
- NSF GOALI: Investigation of Metrology Issues in Chemical Mechanical Planarization Processes for Microelectronics Manufacturing (\$239,994) 2002-2005
- Florida High Tech Corridor: Nanoscale Chemical, Tribological and Mechanical Properties of Surface Engineered/Modified Polymers – A Joint USF and UCF Project (\$110,537) 2002-2003
- Florida High Tech Corridor: Nanoscale Mechanical and Tribological Characterization of Hard Coatings (\$50,000) 2002-2003
- General Motors: Diamond Coatings on WC-Co Cemented and High-speed Steel (HSS) for Dry Machining Applications (\$63,250) 2003-2005

University of South Alabama (1993-1999)

- NASA EPSCoR “Laser Processed Surface Modification, Thin Films, and Coating” (\$1,256,512) 1994-2000
- TVA “Laser Processed Superhard Coating for Tribological Applications” (\$27,696) 1994-1995
- DOE EPSCoR Graduate Trainee Fellowship “Laser Patterning of Organic Semiconducting Materials” (\$18,142) 1994-1995
- NSF Academic Research Infrastructure “Acquisition of Scanning Electron Microscope and X-ray Diffractometer for Education and Research” (\$159,430) 1995-1998
- USA Research Council “Ferroelectric Thin Films for Electronic Materials” (\$2,500) 1994-1995
- NSF SIP “Smart Materials for Transport Control” (\$270,000) 1995-1998
- DOE EPSCoR Young Investigator Award “Wave-guide Structures on Organic Thin Films by Laser Patterning Method” (\$19,380) 1995-1997
- NRC Twinning Fellowship Program “Growth and Characterization of Carbides/Nitrides Thin Films Prepared by Laser Processed Methods” (\$13,000) 1997-1999
- NASA “Research Equipment Grant for the Acquisition of FTIR Spectrometer for Multifunctional Applications” (\$40,000) 1997-1998
- NSF EPSCoR Young Investigator Award “Synthesis and Characterization of Pulsed Laser Ablated Biocompatible Thin Films” (\$44,452) 1997-1998
- NASA Space Grant Consortium “Engineered Nanostructured Materials with Laser Assisted Methods” (20,000) 1999-2000

THESIS SUPERVISORS

Chair of the committee (University of South Florida)

PhD Students:

1. Parshuram Zantye, "A Study of Integration Issues in Cu-Low k dielectric materials in Damascene structure"
2. Souheil Zekri, "Design an Implementation of Sputtering Deposition System for Microelectronics/ Biological Applications"
3. Jai Krishna Sanku, "Evaluation and modeling of Mechanical and Tribological Properties of Thin Film Coatings"
4. Zhenquin Xu, "Nanocrystalline Diamond for MEMS Applications"

Master Students:

1. Pallavi Shukla, "Evaluation of Mechanical Properties of Thin Films Using Nanoindentation Technique"
2. Uttam Bandugula, "Synthesis and characterization of super hard coatings by laser ablation"
3. Sindhura Valdhamani, "Synthesis and Characterization of Wide Bandgap semiconductor Thin Films"
4. Swetha Thagella, "Studies of Tribological Properties and Modeling of Removal Rate of low k and Cu in Chemical Mechanical Planarization"
5. Juan Cruz, "Thin film deposition for super hard coating applications"

Chair of the committee (University of South Alabama)

1. Xiao Ping Wu "Evaluation of Buffer Layers for High Temperature Superconductors"
2. David Kjendal, "Design and Implementation of Physical vapor and Chemical Vapor Assisted Thin Film Deposition Systems and the study of Laser Processed Polymeric Materials"
3. U. Ekanayake, "Growth, Structure and Mechanical Properties of Laser Processed Superhard Coatings"
4. N. Shu, "The Study of Electrical, Dielectrical, and Mechanical Properties of Electronic Ceramic Thin Films"
5. H. Chan, "Laser Processing of Nitride and Carbide Coatings for Multifunctional Applications"
6. Q. You, "Synthesis and Characterization of Diamond Films Grown by Hot Filament Chemical Vapor Deposition Technique"
7. Y. Mingte, "Silicides Thin Film Technology for VLSI Applications"
8. I. Hussain " Development and Applications of Piezoelectric Biosensor"
9. M. Alam, "Synthesis and Characterization of Ferroelectric Thin Film Capacitor for Memory Device Applications"
10. I. Ahmed "Deposition of Textured Diamond Growth using Hot-Filament Assisted Chemical Vapor Deposition Method"
11. Michael Galeev " Diamond Film Growth on Structural Substrates for Cutting Tool Applications"
12. H. Rahman "Growth, Modeling and Device Implementation of Pulsed Laser Deposited Thin Films"

13. Yibing Geng “Fabrication and Device Implementation of Laser Processed Ferroelectric Thin Film”
14. R. Bahl “Evaluation of Mechanical Properties of Superhard Coatings”
15. D. Patel “Preparation and Properties of Pulsed Laser Deposited Superhard Coatings”
16. Ganesh Sivanathan “Effects of Surface Treatment and Gas Ambient on Growth of Hot Filament Chemical Vapor Deposited Diamond Coatings”
17. Rajesh Kumar Katre “Study of Electrical and Dielectric Properties of Laser Processed Ferroelectric Thin Films Using LaNiO₃ as Electrode”
18. M. Yassin “Electrical and Dielectric Properties of DRAM Capacitors”
19. Manoj K. Raddar, “Studies of Mechanical Properties of Carbide and Nitride Coatings System
20. Aravinda N. Sringarapuram, “Study of Electrical and Dielectrical Properties of Ferroelectric Capacitors for DRAM and NVRAM Applications

TEACHING ACTIVITIES

Courses Taught at USF (2000-present)

EGN 3365 Materials Engineering I
 EML 4930 Electronic Materials Manufacturing
 EML 6930 Electronic Materials Manufacturing

Courses Taught at USA (1993-1999)

Electronic Devices
 Physical Electronics
 Electronic Thin Film Science
 VLSI Technology and Fabrication
 Electronics Circuit Lab
 Basic Electrical Engineering I
 VLSI Design System
 Professional & Ethics in EE/CPE
 Digital Design I
 Random Signal and Linear Systems
 Thin Film Technology
 Advances in Semiconductor Devices

UNIVERSITY SERVICE

- ME Department Undergraduate Committee (2000-present)
- ME Department Graduate Committee (2000-present)
- CMR Faculty Search Committee (Electronic Materials, Spring 2001)
- CMR Faculty Search Committee (MEMS, Spring 2001)
- College of Engineering REU coordinator, (M.E. Department)
- ME Department Faculty search committee, (2001-present)
- Member of USF faculty senate, (2003- present)

PROFESSIONAL ASSOCIATION

Society Membership

Materials Research Society (MRS)
American Vacuum Society (AVS)
American Ceramic Society (ACeRS)
American Society of Metals (ASM)
The Minerals, Metals and Materials Society (TMS)
American Physical Society (APS)
Institute of Electrical and Electronics Engineers (IEEE)

Executive Council Member

- (i) Secretary of Thin Film Interfaces Committee and Advisor to Journal of Metal, TMS Society (1998-2000)
- (ii) Vice-President of Thin Film Interfaces Committee and Advisor to Journal of Metal, TMS Society (2000-present)
- (iii) Continuing Education Committee Member, TMS (1999-2000)

Symposium Organizers

- (i) **Ashok Kumar**, Yip-Wah Chung, and Ray W. J. Chia “Hard Coatings Based on Borides, Carbides and Nitrides: Synthesis, Characterization and Applications, **TMS Annual Meeting** at San Antonio (1998)
- (ii) **Ashok Kumar**, Yip-Wah Chung, John Moore, and John Smugeresky, “Surface Engineering: Science and Technology I” **TMS Annual Meeting** at San Diego (1999)
- (iii) N. M. Ravindra, **Ashok Kumar**, Sailesh M. Merchant, M. Anthony, and M. K. Sanganeria “Materials and Processes for Submicron Technologies” **TMS Annual Meeting** at New Orleans (2001)
- iv) Wen Jin Meng, **Ashok Kumar**, Yip-Wah Chung, Gary L. Doll, Yang-Tse Cheng, Stan Veprek, “Advances in Surface Engineering- Fundamentals and Applications, **MRS Fall Meeting** (2001)
- v) **Ashok Kumar**, Yip-Wah Chung, John Moore, and John Smugeresky, “Surface Engineering: Science and Technology II” **TMS Annual Meeting** at Seattle (2002)
- vi) Seung Kang, M. K. Sanganeria, **Ashok Kumar**, Sailesh M. Merchant, and N. M. Ravindra “Materials and Processes for Submicron Technologies -II” **TMS Annual Meeting** at Seattle (2002)

Organizing Committee Member

- (i) Alabama Materials Research Council (1996-1998)
- (ii) 12th International Conference on Surface Modification Technologies, ASM (1998)
- (iii) International Conferences Series on Photo-Excited Processes and Applications (3-ICPEPA), Strasbourg, France (1999)

Technical Session Chair

- (i) High Temperature Coatings II (1996 TMS Annual Meeting, Anaheim (CA))
- (ii) Advances in Materials for Smart System -Fundamental and Applications (1996 MRS Fall Meeting, Boston)
- (iii) ROMOPTO, 97 (5th Conference on Optics, Bucharest, Romania)
- (iv) Surface Engineering, 97 (CIMTEC Conference, Florence, Italy)

PUBLICATIONS

Edited 5 books, more than 90 refereed publications, approx. 50 conference presentations and 20 invited talks

Scholarly Books

- (1) Ashok Kumar, Yip-Wah Chung, and Ray W. J. Chia Hard Coatings Based on Borides, Carbides and Nitrides: Synthesis, Characterization and Applications, TMS (1998)
- (2) Ashok Kumar, Yip-Wah Chung, John Moore, and John Smugeresky, TMS, (1999), Surface Engineering: Science and Technology I, TMS (1999)
- (3) Wen Jin Meng, Ashok Kumar, Gary L. Doll, Yang-Tse Cheng, Stan Veprek, and Yip-Wah Chung, Surface Engineering 2001- Fundamentals and Applications, MRS Symposium Proceedings, Volume 697 (2001)
- (4) Ashok Kumar, Yip-Wah Chung, John Moore, D. S. Misra, and K. Yatsui, "Surface Engineering: Science and Technology I, TMS (2002)
- (5) Ashok Kumar, Wen Jin Meng, Yang-Tse Cheng, J. Zabinski, Gary L. Doll, and Stan Veprek (Editors), " Surface Engineering 2002 – Synthesis, Characterization and Applications, Volume 750 (2002)

Book Chapters

- (1) J. S. Kapat and Ashok Kumar "Chemical Vapor Deposition of Intermetallic and Ceramic Coatings" pp. 441-484, Edited by N. B. Dahotre and T. S. Sudarshan, Marcel Decker Inc., New York (1999)
- (2) Arun K. Sikder and Ashok Kumar, "Superhard Coatings in C-B-N System: Growth and Characterization", Vol. 2, Chap. 3, pp. 115-190, Handbook of Thin Films Materials, Edited by Prof. H. S. Nalwa, Academic Press (2001)

Refereed Publications

- 1. Ashok Kumar, L. Ganapathi and J.Narayan "In-situ processing of textured superconducting thin films of Bi-(Pb)-Ca-Sr-Cu-O_x by excimer laser ablation" Applied Physics Letters, 56, 2034-2036 (1990)
- 2. Ashok Kumar, L. Ganapathi, S. M. Kanetkar and J.Narayan "Single chamber in-situ processing of superconducting YBa₂Cu₃O_{7-δ} thin films on stainless steel

- with yttria-stabilized zirconia buffer layer" J. Applied Physics, 69, 2410-2413 (1991)
3. *Ashok Kumar*, L. Ganapathi, S. M. Kanetkar and J. Narayan "Synthesis of superconducting YBa₂Cu₃O_{7-δ} thin films on nickel based superalloy using in-situ pulsed laser ablation" Applied Physics Letters, 57, 2594-2596 (1990)
 4. *Ashok Kumar* and J. Narayan "Superconducting YBa₂Cu₃O_{7-δ} thin films on Si (100) substrates with CoSi₂ buffer layer by in-situ pulsed laser evaporation method" Applied Physics Letters, 59, 1785-1787 (1991)
 5. *Ashok Kumar*, J. Narayan and X. Chen "Enhancement in critical current density of YBa₂Cu₃O_{7-δ} thin films on hastelloy with TiN buffer layers" Applied Physics Letters, 61, 976-978 (1992)
 6. L. Ganapathi, *Ashok Kumar* and J. Narayan "Properties of YBa₂Cu₃O_{7-δ} composites superconductors" J. Applied Physics. 66, 5935-5939 (1989)
 7. L. Ganapathi, J. Narayan and *Ashok Kumar* "Variation of T_{co} in the 110 K superconductor Bi_{1.5}Pb_{0.5}Ca₂Sr₂Cu₃O_x" Applied Physics Letters, 55 1460-1462 (1989)
 8. L. Ganapathi, *Ashok Kumar* and J. Narayan "Characterization of high-T_c La_xY_{1-x}Ba₂Cu₃O_{7-δ} superconductors", Physica C, 167, 669-676 (1990)
 9. L. Ganapathi, *Ashok Kumar* and J. Narayan "In-situ processing of LaBa₂Cu₃O_{7-δ} thin films by laser ablation method" Physica C, 168, 599-604 (1990)
 10. L. Ganapathi, *Ashok Kumar* and J. Narayan "Superconducting and semiconducting thin films of La₁₂₃ and Y₁₂₃ and their superlattices", MRS, High Temperature Superconductor: Fundamental Properties and Novel Materials, Vol. 169, 561-564 (1989)
 11. L. Ganapathi, *Ashok Kumar* and J. Narayan "Role of silver in YBa₂Cu₃O_{7-δ} composite superconductors," MRS, High Temperature Superconductor: Fundamental Properties and Novel Materials Processing, Vol. 169 169, 1267-1274 (1989)
 12. *Ashok Kumar*, L. Ganapathi and J. Narayan "Textured superconducting thin films of Bismuth cuprate by laser ablation method," MRS, High Temperature Superconductor: Fundamental Properties and Novel Materials Processing Vol. 169, 527-532 (1989)
 13. *Ashok Kumar*, P. Somanathan, M. N. Mungole and K. P. Singh "Study of oxidation behavior of modified 9Cr-1Mo ferritic steel at elevated temperature and pressure" International Conference on Metallic Corrosion, 3641-3650 (1987)
 14. A. M. Gokhale and *Ashok Kumar* "Analysis of particle coarsening in Al-Pb alloy" Transaction of Indian Institute of Metal, volume 42, No.4, 401-404 (1989).
 15. P. K. Rohatgi, R. Asthana, *Ashok Kumar*, D. Nath and S. Schroeffer "Damping capacity of Aluminum alloy matrix composites" World materials congress, "Cast Reinforced Metal Composite" American Society of Metals, 375-381(1988).

16. T. Zheleva, K. Jagannadham, *Ashok Kumar*, and J. Narayan "Epitaxial Growth of TiN on GaAs(100) by pulsed laser deposition," MRS, Laser Application in Materials Processing: Fundamentals and Application, Vol. 285, 343-348 (1993)
17. *Ashok Kumar* and J. Narayan "Laser deposition of YBa₂Cu₃O_{7-δ} thin films on flexible metallic substrates with TiN buffer layers" Superconductor Science and Technology, Vol. 6, 662-669 (1993)
18. S. Permanick, *Ashok Kumar* and J. Narayan "Optical emission during layered growth of PrBCO/YBCO high-T_c superconducting thin film by pulsed laser evaporation "Japn. J. Applied Physics" part 2, vol. 12, 2349-2351, October (1993).
19. R. N. Soni, S. Sathaiyah, H. C. Joshi, H. D. Bist, G. S. Raghuvanshi, *Ashok Kumar* and J. Narayan "Micro-Raman study of laser ablated thin films deposited on inconel with a TiN buffer layer" J. of Raman Spectroscopy, Vol. 25, 275-280 (1994).
20. *Ashok Kumar*, J. Narayan and Bijoy Patnaik "Trilayered heterostructures in-situ laser deposited high temperature superconductors" Physica C, 209 421-427 (1993)
21. R. Spall and *Ashok Kumar* "Spectral collocation methods for one-dimensional phase change problems with applications in laser processing of materials" ASME Heat Transfer Publication, 1-8 (1995)
22. *Ashok Kumar*, R. B. Inturi, Y. Vohra, U. Ekanayake, N. Shu, D. Kjenal, G. Wattuhewa and J. A. Barnrad "Mechanical properties of laser processed diamond-like carbon films," MRS, "Advanced Laser Processing of Materials", Vol. 397, 289-296 (1996)
23. D. Kjenal, *Ashok Kumar*, R. B. Inturi and J. A. Barnard "Pulsed laser deposition of poly(tetraflouroethylene) films," MRS "Advanced Laser Processing of Materials", Vol. 397, 223-228 (1996)
24. R. B. Inturi, *Ashok Kumar*, U. Ekanayake, N. Shu and J. A. Barnard "Growth and characterization of hard nitrides films prepared by pulsed laser deposition" MRS, "Polycrystalline Thin Films II, Vol. 403, 283-290 (1996)
25. *Ashok Kumar*, U. Ekanayake, D. Kjenal, N. Shu, R. B. Inturi and J. A. Barnard "Structural and mechanical properties of pulsed laser processed superhard coatings" TMS, High Temperature Coating II, 349-360 (1996)
26. *Ashok Kumar*, U. Ekanayake, R. B. Inturi and J. A. Barnard "Synthesis of Carbon Composite Thin Films Prepared by Pulsed Laser Deposition Method" MRS, Layered Materials for Structural Applications, Vol. 434, 189-194 (1996)
27. *Ashok Kumar*, U. Ekanayake, R. B. Inturi and J. A. Barnard "Growth, Structure and Mechanical Properties of Pulsed Laser Deposited TiN/TiB₂ Microlaminates" MRS, Thin Films- Stresses and Mechanical Properties VI, Vol. 436, 65-70 (1996)
28. N. Shu, *Ashok Kumar*, M. R. Alam, H. L. Chan and Q. You "Study of Dielectrical Properties of Laser Processed BaTiO₃ Thin Films on Si(100) with TiN Buffer Layers" Applied Surface Science, 109/110, 366-370 (1997)
29. M. R. Alam, *Ashok Kumar*, N. Shu, H. L. Chan, and Q. You, "Preparation of TiNi Ferroelastic-Ferroelectric Thin Film Heterstructures" Applied Surface Science, 109/110, 393-398 (1997)

30. H. L. Chan, U. Ekanayake, *Ashok Kumar*, M. R. Alam, Q. You, R. B. Inturi, N. Shu and J. A. Barnard "Nanoindentation Studies of Hard Coatings Prepared by Laser Ablation" *Applied Surface Science*, 109/110, 58-61 (1997)
31. I. Hussain, *Ashok Kumar*, S. C. Perlaky, C. C. McCombs, F. Zhong, J. J. Weimer and L. Sanderson "Fabrication of Piezoelectric Sensors for Biomedical Applications" *MRS, Materials for Smart System*, Vol. 459, 501-506 (1997)
32. H. L. Chan, *Ashok Kumar*, L. Sanderson and J. J. Weimer "Atomic Force Microscopy study of Hard Coatings Films Prepared by Pulsed Laser Deposition Method" *MRS, Thin Film- Structure and Morphology*, Vol. 441, 487-493 (1997)
33. *Ashok Kumar*, H. L. Chan and N. B. Dahotre "Structural and Hardness Studies of CN_x/TiN Composite Coatings on Si (100) Substrates by Pulsed Laser Deposition Method" *Journal of Materials Engineering and Performance*, Vol. 6 (5), 583-585, (1997)
34. *Ashok Kumar*, H. L. Chan, U. Ekanayake, A. Weirzbicki, N. B. Dahotre and S. C. Sikes "Laser Ablation Synthesis and Characterization of Carbide and Nitride Coatings" *Journal of Materials Engineering and Performance*, Vol. 8 (5), 577-582, (1997)
35. M. R. Alam, *Ashok Kumar*, A. Mangiarcina and M. Shamsuzzoha "Synthesis of the PZT Films Deposited on Pt-coated (100) Si Substrates for Nonvolatile Memory Applications" *J. of Electronic Materials*, Vol. 28, No. 10, 1331-1334 (1997)
36. *Ashok Kumar*, Q. You, A. Mangiarcina, J. S. Kapat, S. A. Catledge and Y. Vohra "Evaluation of Barrier Layer for HFCVD Diamond Films on Silicon Substrates" *Thin Solid Films*, vol. 308-309, 209-214 (1997)
37. H. L. Chan, *Ashok Kumar*, L. Sanderson and J. J. Weimer "Structural Characterization of AlN Thin Films on Semiconductor Substrates by Laser Ablation Method," *Thin Solid Films*, vol. 308-309, 406-409(1997)
38. *Ashok Kumar*, H. L. Chan and Y. Vohra "Characterization of Pulsed Laser Deposited Diamond-like Carbon Films" *Surface Coatings & Technology*, 102, 113-118 (1998)
39. Z. Wei, J. S. Kapat and *Ashok Kumar* "Role of Kinetics in Laser Processing" *Applied Surface Science*, vol. 127-129, 212-217 (1998)
40. J. S. Kapat, Z. Wei and *Ashok Kumar* "Role of Kinetics of Transformation in Pulsed Laser Ablation" *Applied Surface Science*, 4957 (1998)
41. *Ashok Kumar*, H. L. Chan and J. S. Kapat "Deposition and Characterization of Titanium Carbide Thin Films" *Applied Surface Science*, vol. 127-129, pp 549-552 (1998)
42. *Ashok Kumar*, H. L. Chan and R. Alexandrescu "The synthesis, characterization and mechanical properties of carbides and nitrides films prepared by pulsed laser deposition method" *SPIE, ROMOPTO*, vol. 3405, 199-204 (1997)
43. *Ashok Kumar*, Q. You, I. Ahmed and A. Mangiaracina "Enhancement of nucleation density of HFCVD diamond films on silicon substrates with laser processed buffer layers" *SPIE, ROMOPTO* vol. 3405 (1997)

44. *Ashok Kumar*, M. R. Alam and A. Mangiaracina “Preparation of ferroelectric thin films by KrF excimer laser ablation for memory applications” SPIE, ROMOPTO vol. 3405 (1997)
45. A. Crunteanu, R. Alexandrescu, R. Cireasa, I. Morjan, and *Ashok Kumar* “Deposition of carbon nitride thin films by IR laser-induced reactions in carbon-nitrogen gas-phase compounds” SPIE, ROMOPTO vol. 3405 (1997)
46. *Ashok Kumar*, H. L. Chan, and M. Shamsuzzoha “Growth and Characterization of Crystalline Metal Nitrides Coatings Prepared by Pulsed Laser Deposition Method” TMS, “Hard Coatings Based on Borides, Carbides, and Nitrides: Synthesis, Characterization and Applications”, *Editors: Ashok Kumar*, Y Chung and Ray W. J. Chia , 219-229 (1998)
47. M. A. George, J. J. Weimer, and *Ashok Kumar*, “Characterization of Titanium Films Produced by Physical Vapor Deposition Techniques” TMS Proceeding “Hard Coatings Based on Borides, Carbides, and Nitrides: Synthesis, Characterization and Applications”, *Editors: Ashok Kumar*, Y Chung and Ray W. J. Chia , 203-209 (1998)
48. M. Shamsuzzoha and *Ashok Kumar* “A TEM study of epitaxial (100) TiC film grown on Si(100) substrates by pulsed laser deposition method, TMS Proceeding “Hard Coatings Based on Borides, Carbides, and Nitrides: Synthesis, Characterization and Applications”, *Editors: Ashok Kumar*, Y Chung and Ray W. J. Chia , 249- 257 (1998)
49. R. Alexaandrescu, A. Crunteanu, R. Cireasca, I. Morjan, and *Ashok Kumar*, “Carbon nitride thin film synthesized from the gas-phase by laser-induced reactions: a parametric study, TMS Proceeding “Hard Coatings Based on Borides, Carbides, and Nitrides: Synthesis, Characterization and Applications”, *Editors: Ashok Kumar*, Y Chung and Ray W. J. Chia , 73-88 (1998)
50. *Ashok Kumar*, R. Alexandrescu, M. A. George, “Deposition and characterization of carbon nitride films by laser processed methods” MRS, Advances in Laser Ablation of Materials, Volume 526, 367-372 (1998)
51. *Ashok Kumar* and M. R. Alam, “Synthesis and characterization of ferroelectric thin films by KrF excimer laser ablation for memory applications” MRS, Advances in Laser Ablation of Materials, Volume 526 , 211-217 (1998)
52. *Ashok Kumar*, I. Hussain, A. Mangiaracina, S. C. Perlaky and C. C. McCombs “Design and implementation of a piezoelectric biosensors for multifunctional applications”, Integrated Design and Process Technology” IDPT-Vol . 1, 35- 41 (1998)
53. *Ashok Kumar* and Q. You, “The effects of template layer of AlN on HFCVD diamond nucleation” International Symposium Proceeding World Ceramic Congress and Forum on New Materials (1998)
54. *Ashok Kumar*, H. L. Chan, and Rodica Alexandrescu “Pulsed laser deposition of carbides and nitrides coatings” International Symposium Proceeding World Ceramic Congress and Forum on New Materials (1998)
55. *Ashok Kumar*, “Pulsed laser deposition of superhard nitride coatings,” Materials and Manufacturing Processes, Vol. 14, No. 3, 397-411 (1999)

56. R. Alexandrescu, R. Cireasa, C. S. Cojocaru, A. Crunteanu, I. Morjan, F. Vasiliu, and *Ashok Kumar*, "Carbon nitride thin films and nanopowders produced by CO₂ laser pyrolysis" Surface Modification Technologies XII, Edited by T. S. Sudarshan, K. A. Khor, and M. Jeandin (1998)
57. *Ashok Kumar* and R. Alexandrescu, "Laser assisted deposition of carbon nitride coatings" MRS, 'Properties and Processing of Vapor-Deposited Coatings' Vol. 555, 387-393 (1999)
58. R. Alexandrescu, R. Cireasa, A. Crunteanu, C. S. Cojocaru, I. Morjan, *Ashok Kumar*, and F. Vasiliu, "Synthesis of crystalline structure of CN_x thin films deposited on sapphire and quartz substrates" MRS, 'Properties and Processing of Vapor-Deposited Coatings' Vol. 555, 413-418 (1999)
59. *Ashok Kumar* and M. Shamsuzzoha, "Synthesis and characterization of polycrystalline TiN/TiB₂ microlaminates coatings, TMS Proceeding, Surface Engineering: Science and Technology I, Editors: Ashok Kumar, Yip-Wah Chung, John J. Moore and John E. Smugeresky, 165-173 (1999)
60. M. Shamsuzzoha and *Ashok Kumar*, "Structural study and mechanisms of nucleation and growth of diamond crystal grown on scratched Si(100) substrate by hot filament chemical vapor deposition method, TMS Proceeding, Surface Engineering: Science and Technology I, Editors: *Ashok Kumar*, Yip-Wah Chung, John J. Moore and John E. Smugeresky, 367-376 (1999)
61. *Ashok Kumar*, H. Rahman, and M. Shamsuzzoha, "Fabrication of PZT based capacitor with SrRuO₃ electrode for memory device applications, MRS, Ferroelectric Thin Films VII, Vol. 541, 153-160 (1999)
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