

PROMOTION RECOMMENDATION

The University of Michigan

College of Engineering

Lumin Wang, professor of nuclear engineering and radiological sciences, without tenure, Department of Nuclear Engineering and Radiological Sciences, is recommended for the granting of tenure to be held with his title of professor of nuclear engineering and radiological sciences, Department of Nuclear Engineering and Radiological Sciences, College of Engineering [also professor of materials science and engineering, without tenure, Department of Materials Science and Engineering, College of Engineering].

Academic degrees:

Ph.D. 1988 University of Wisconsin, Materials Science, Madison, WI
 M.S. 1984 University of Wisconsin, Materials Science, Madison, WI
 Dipl. 1982 Beijing Polytechnic University, Metallic Materials Engineering, PRC

Professional Record:

2005-present Professor (without tenure), Department of Nuclear Engineering and Radiological Sciences, University of Michigan
 2005-present Professor (without tenure), Department of Materials Science and Engineering, University of Michigan
 2005-present Director, Electron Microbeam Analysis Laboratory, University of Michigan
 2004 Research Scientist, Department of Geological Sciences, University of Michigan
 2003-2004 Research Scientist, Department of Materials Science and Engineering, University of Michigan
 2002-2004 Research Scientist, Department of Nuclear Engineering and Radiological Sciences, University of Michigan
 1997-2002 Associate Research Scientist, Department of Nuclear Engineering and Radiological Sciences, University of Michigan
 1995-1997 Research Associate Professor and Senior Research Scientist, Department of Earth & Planetary Sciences, University of New Mexico, Albuquerque, NM
 1992-1995 Research Scientist Department of Earth & Planetary Sciences, University of New Mexico, Albuquerque, NM
 1990-1997 Manager of the Transmission Electron Microscopy Laboratory, Department of Earth & Planetary Sciences, University of New Mexico, Albuquerque, NM
 1989-1990 Post-doctoral Fellow, Radiation Effects and Kinetics Group, Materials Science Division, Argonne National Laboratory

Summary of Evaluation:

Teaching: Although Professor Wang had little classroom teaching experience prior to his professorial appointment, he has proven to be very effective and successful in the classroom. He has received excellent student evaluations as well as enthusiastic student letters. He has been responsive to student feedback in his courses and has become an outstanding teacher. He has chaired and co-chaired Ph.D. committees for a total of ten students, four of whom have already received their degrees. His students have valued his mentorship, high standards and inclusiveness.

Research: Professor Wang is a prolific and highly cited researcher, who has published in the most selective and prestigious journals. He has co-authored over 200 papers in peer-reviewed journals. He has given many invited talks at technical conferences, as well as in workshops and academic institutions

worldwide. He has established his identity as a world-class expert on radiation effects in materials, ion-solid interactions and high-resolution electron microscopy. In his recent research, he has been using his expertise on radiation effects to create nanoscale materials with novel properties. Professor Wang leads a very active research group, which is involved in a broad range of research topics. His peers hold him in high regard, which is also evident in the great number of leaders in the field who seek him out as a collaborator. In addition to leading many research projects, he is also actively involved in numerous collaborations with colleagues at the University of Michigan. Professor Wang has been very successful in securing funding for his extensive research activity, from both the Federal Government and the private sector. This has enabled him to fund many Ph.D. students and visiting scholars.

Recent and Significant Publications:

- N. Li, H.Y. Xiao, X.T. Zu, L.M. Wang, R.C. Ewing and J. Lian, F. Gao, First-principles study of electronic properties of La₂Hf₂O₇ and Gd₂Hf₂O₇, *Journal of Applied Physics* 102 (2007) 063704-1-6.
- S. Zhu, S.X. Wang, L.M. Wang, R.C. Ewing and X.T. Zu, Behavior of implanted strontium in yttria-stabilized zirconia, *Applied Physics Letters* 90 (2007) 171915-1-3.
- Z.G. Wang, X.T. Zu, S. Zhu, and L.M. Wang, Green luminescence originates from surface defects in ZnO nanoparticles, *Physica E* 35 (2006), pp. 199-202.
- X. Xiang, X.T. Zu, S. Zhu, C.F. Zhang and L.M. Wang, Effects of annealing on the optical absorption of Ni nanoparticles in MgO single crystals, *Nuclear Instruments & Methods in Physics Research B* 250 (2006), pp. 229-232.
- Z.G. Wang, X.T. Zu, X. Xiang, S. Zhu and L.M. Wang, Surface modification of Ti-4Al-2V alloy by nitrogen implantation, *Journal of Materials Science* 41 (2006), pp. 3363-3367.
- C.M. Liu, X.T. Zu, Q.M. Wei and L.M. Wang, Fabrication and characterization of wire-like SnO₂, *Journal of Physics D: Applied Physics* 39 (2006), pp. 2494-2497.
- T.C. Lu, X.H. Chang, J.Q. Qi, X.J. Luo, Q.M. Wei, S. Zhu, K. Sun, J. Lian, L.M. Wang, Low-temperature high-pressure preparation of transparent nanocrystalline MgAl₂O₄ ceramics, *Applied Physics Letters* 88 (2006), 2131201-3.
- X. Xiang, X.T. Zu, S. Zhu, Q.M. Wei, C.F. Zhang, K. Sun and L.M. Wang, ZnO nanoparticles embedded in sapphire fabricated by ion implantation and annealing, *Nanotechnology* 17 (2006) 2636-2640.
- J. Lian, W. Zhou, Q.M. Wei, L.M. Wang, L.A. Boatner and R.C. Ewing, Simultaneous formation of surface ripples and metallic nanodots induced by phase decomposition and focused ion beam patterning, *Applied Physics Letters* 88 (2006), 093112-1-3.
- Z.G. Wang, X.T. Zu, X. Xiang, S. Zhu, L.M. Wang, Origin of luminescence from PMMA functionalized nanoparticles, *Physics Letters A* 350 (3-4) (2006), pp. 252-257.
- S. Zhu, L.M. Wang, X.T. Zu, and X. Xiang, Optical and magnetic properties of Ni nanoparticles in rutile formed by Ni ion implantation, *Applied Physics Letters* 88 (2006), 043107-1-3.

Service: Professor Wang's service contributions have been very strong. He has been a member of numerous committees at the department, college and university level, some of which consist of elected members. As the director of the Electron Microbeam Analysis Laboratory, he has provided the technical and administrative leadership that has enabled this multimillion-dollar laboratory to support research activities of dozens of groups in several schools and colleges across campus. At the national level, Professor Wang has been a member of governmental review panels and a symposium organizer.

External Reviewers:

Reviewer A: "Overall, I believe that Professor Wang's research is first rate, and that he made substantial and creative research contributions in the general field of radiation interaction with materials. ... This breakthrough may open the door to other fabrication techniques that rely on natural self-assembly of

nanostructures.... Professor Wang's research contributions are outstanding in these research areas, and are marked by keen interest into the basic underlying physical mechanisms.”

Reviewer B: “Professor Wang is a well known leading scientist in the area of radiation effects and ion beam modification of materials, especially with impressive achievements through the application of transmission electron microscopy. ... The application of his early expertise in radiation damage in nuclear materials to the processing of nanostructures is truly an innovative approach... His recent results presented in international conferences contain many exciting new results in nanoscience and technology.”

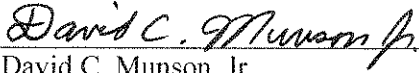
Reviewer C: “His TEM work is both meticulous and exciting. Given the renaissance of nuclear energy interest, he is ideally poised to expand an already successful program.”

Reviewer D: “I have been associated with ion implantation and damage nucleation in the past, and it appears to me that his scholarly impact in his field is comparable to anyone I can think of.”

Reviewer E: “Lumin has contributed greatly to our understanding of radiation resistance of materials. His papers on olivine, spinel and cubic zirconia are impressive.”

Reviewer F: “For example, his landmark paper on the fundamentals of the crystalline to amorphous transition in irradiated zircon (J. Mater. Res., vol. 9, 1994) is one of the most highly cited papers in the radiation effects literature. ... He is clearly among the leading researchers worldwide in the field of radiation effects in inorganic materials. In particular, his microstructural observations and associated analysis on ion beam amorphization of complex ceramics have provided numerous advances in scientific understanding. He is an exceptionally talented microscopist, and also possesses a firm grasp of fundamental mechanisms of radiation effects in materials. ... As a measure of his national and international stature, he is regularly asked to give invited presentations at international conferences and has been the organizer of several symposia at professional society meetings.”

Summary of Recommendation: Professor Wang is a prominent scientist who has excelled in all areas of academic endeavor. He combines the outstanding hands-on and scientific expertise required to carry out research on irradiation effects and nanostructured materials. He is an excellent classroom teacher and advisor of doctoral students and is a prolific author of high impact scientific publications. He is able to attract substantial funding to support his research activities and his doctoral students. Professor Wang enjoys a strong international reputation and his visibility in the international scientific community is an asset to the university. It is with the support of the College of Engineering Executive Committee that I recommend Lumin Wang be granted tenure in his title as professor of nuclear engineering and radiological sciences, Department of Nuclear Engineering and Radiological Sciences, College of Engineering.


David C. Munson, Jr.
Robert J. Vlasic Dean of Engineering
College of Engineering

May 2008