

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering

Nicholas Kotov, associate professor of chemical engineering, with tenure, Department of Chemical Engineering, associate professor of materials science and engineering, without tenure, Department of Materials Science and Engineering, and associate professor of biomedical engineering, without tenure, Department of Biomedical Engineering, College of Engineering, is recommended for promotion to professor of chemical engineering, with tenure, Department of Chemical Engineering, professor of materials science and engineering, without tenure, Department of Materials Science and Engineering, and professor of biomedical engineering, without tenure, Department of Biomedical Engineering, College of Engineering.

Academic Degrees:

Ph.D.	1990	Moscow State University, Chemistry, Moscow, Russia
M.S.	1987	Moscow State University, Chemistry, Moscow, Russia

Professional Record:

2004-present	Associate Professor, without tenure, Department of Materials Science and Engineering, University of Michigan, Ann Arbor
2004-present	Associate Professor, without tenure, Department of Biomedical Engineering, University of Michigan, Ann Arbor
2003-present	Associate Professor, with tenure, Department of Chemical Engineering, University of Michigan, Ann Arbor
2001-2003	Associate Professor, Chemistry Department, Oklahoma State University, Stillwater, OK
1997-1999	Visiting Professor, Hamburg University, Hamburg, Germany
1996-2001	Assistant Professor, Chemistry Department, Oklahoma State University, Stillwater, OK
1992-1996	Postdoctoral Associate, Chemistry Department, Syracuse University, Syracuse, NY
1990-1992	Research Associate, Laboratory of Photochemistry, Chemistry Department, Moscow State University

Summary of Evaluation:

Teaching: Professor Kotov has received very high marks for teaching his graduate course "Foundations of Nanotechnology", achieving a Q2 score of 4.82 most recently. At the undergraduate level, Professor Kotov has taught the undergraduate thermodynamics core course ChE 330 in three terms, and also a section of the laboratory course, ChE 360. Professor Kotov's teaching talent is also apparent in the one-on-one setting of undergraduate research and graduate research project mentoring. He has poured a great deal of energy into bringing large numbers of undergraduate students into his laboratory. Professor Kotov has graduated six Ph.D. students and currently counts 11 in the pipeline, three of whom are expected to graduate in 2008.

Research: Professor Kotov's research in the highly interdisciplinary field of nanoscale science and engineering is original, creative, rigorous, and profound. He has many diverse and broad-ranging contributions, including, e.g., pioneering the development of the layer-by-layer technique for the synthesis and fabrication of nanocomposite materials, synthesizing some of the first and most unusual anisotropic nanocrystalline particles and explaining their properties, why they form, and the assemblies they make, and demonstrating the potential similarity between nanoparticles and proteins. In Professor Kotov's research, fundamental science goes hand in hand with innovative technological application. His

work impacts such applications as medical imaging, drug delivery, tissue engineering, aircraft coatings, and photonics. In his latest publication in the journal *Science*, Professor Kotov and his collaborators used his LBL technique to make a clear, thin, lightweight plastic with the strength of steel; this exciting demonstration of the potential strength of nanomaterials is receiving enormous coverage in the popular press, not unlike many of his other publications. His research is of the very highest quality and level of innovation, and his contributions on various problems within the nanoscience field garner high respect from his peers.

Recent and Significant Publications:

- Podsiadlo P., Kaushik A. K., Arruda E. M., Waas A. M., Shim B. S., Xu J., Nandivada H., Pumpllin B. G., Lahann J., Ramamoorthy A., Kotov N. A., Ultrastrong and Stiff Layered Polymer Nanocomposites, *Science*, 318, pp. 880-83, 2007.
- Shanbhag S., Tang Z., Kotov N.A., Self-Organization of Te Nanorods into V-shaped Assemblies: A Brownian Dynamics Study and Experimental Insights, *ACS Nano*, 1(2), pp. 126-132, 2007.
- Michel M., Taylor A., Sekol R, Podsiadlo P., Kotov N. A. Thompson L.; High Performance, Nanostructured Membrane Electrode Assemblies for Fuel Cells Made by Layer-By-Layer Assembly of Carbon Nanocolloids, *Advanced Materials*, 19(22), pp. 3859-3864, 2007.
- Bong Sup Shim, Zhiyong Tang, Matthew P. Morabito, Nicholas A. Kotov, Integration of conductivity, transparency and mechanical strength in highly homogeneous LBL Composites of SWNT, *Chemistry of Materials*, 19(23), pp. 5467-5474, 2007.
- Shim, B. S., Podsiadlo P., Lilly D., Agarwal A., Tang Z., Ho S., Ingle P., Patterson D., Lu W., Kotov N. A., Nanostructured Thin Films made by Dewetting Method Of Layer-By-Layer Assembly, *Nano Letter*, 7(11), pp. 3266-2373, 2007.
- Govorov A. O., Lee, J., Kotov N. A., Theory of plasmon-enhanced Förster energy transfer in optically-excited semiconductor and metal nanoparticles, *Physical Review B*, 76, 125308, 16pp. 2007.

Service: Professor Kotov has been active in service, both within the University of Michigan, as well as locally, nationally and internationally. Within the Chemical Engineering department, he played a significant role in the recent reorganization of the Doctoral Qualifying Exam (DQE) process. He has served and continues to serve on a number of committees at the Department, College, and University levels. He has also been active at technical meetings, including most notably his service as the vice-chair and then chair of the Gordon Research Conference on Thin Organic Films. Professor Kotov is active in several professional societies, and sits on the editorial advisory boards of several journals. He is an active reviewer of articles and proposals. He has also been able to promote gender and racial diversity of the graduate and undergraduate students working in his research group. Finally, Professor Kotov has also demonstrated service to the local economic community by his activity in helping to spin off technologies that were developed in his laboratory. A group from his laboratory won an Entrepreneurial competition at the Materials Research Society, which has recently lead to the formation of a start-up company (Nico Technologies) that is working to commercialize hydrogel scaffolds for tissue engineering and sensing that have well-defined pore sizes.

External Reviewers:

Reviewer A: "The quality and quantity of Nick's contributions to modern colloid science and materials engineering are exceptionally high for someone at Nick's stage of professional development... .. I place Nick at the very top of established scientists working in his field."

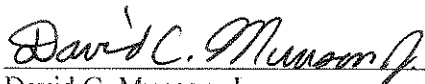
Reviewer B: "Top 5% internationally with respect to layer-by-layer assembly, top 5-10% with respect to the broad area of nanoparticles, nanomaterials, self-assembly, ... both growing."

Reviewer C: “He has published over 100 papers since his promotion to Associate Professor, including a number of landmark papers in top journals such as *Science* and *Nature Materials*. ... There is no question that Nick would already have been promoted to the rank of Professor in my department,”

Reviewer D: “He has published 70+ papers since his arrival at Michigan, in 2003, in high-impact journals such as *Science* and *NanoLetters*. He has brought in \$7.5M in grants since his arrival at Michigan. ... I absolutely recommend that you promote Nick Kotov to full professor.”

Reviewer E: “He is building his own science with drive and vision but also building a community and raising the University of Michigan’s profile in nanomaterials chemistry. I would congratulate you on having the foresight to recruit him from Oklahoma and would urge you to recognize his contribution with a well deserved promotion to the rank of full professor.”

Summary of recommendation: Professor Kotov has achieved international recognition through his superb work and solid scientific products in the field of nanomaterials. He is a proven and devoted teacher and mentor of graduate students, with commitment to student learning. He also serves his communities, both academic and professional, in an exemplary manner. It is with the support of the College of Engineering Executive Committee that I recommend Nicholas Kotov for promotion to professor of chemical engineering, with tenure, Department of Chemical Engineering, professor of materials science and engineering, without tenure, Department of Materials Science and Engineering, and professor of biomedical engineering, without tenure, Department of Biomedical Engineering, College of Engineering.



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

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