

# Mehdi Razzaghi-Kashani

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## AREAS OF EXPERTISE

- Mechanics of Polymeric Composites/Nanocomposites
- Tribology (Friction, Wear, and Lubrication) of Polymer Composites
- Science and Engineering of Rubber Parts and Tires
- Fracture and Fatigue of Rubber Composites
- Electroactive Polymers and Dielectric Elastomers

## EDUCATION

- The University of Akron, Akron, Ohio.
  - Doctorate of Philosophy in Polymer Engineering*, 1997-2000
  - Master of Science and Engineering, Polymer Engineering* 1994-1997
- Amir-Kabir University of Technology (Tehran Polytechnic), Tehran, Iran.
  - Bachelor of Science and Engineering*, 1984 -1988, Chemical Engineering

## PROFESSIONAL MEMBERSHIP

- Member of Iranian Society of Science and Technology of Polymers
- Member of *SPIE-Smart Structures/NDE scientific committee*
- Member of *Iranian Association of Chemical Engineers*
- Member of Polymer Committee, Supreme Council of Educational Planning, Ministry of Science-Research-and Technology
- Managing Editor of Applied Research in Chemical-Polymer Engineering
- Editorial Board Member of Iranian Polymer Journal
- Editorial Board Member of Basparesh Journal
- Editorial Board Member of Iranian Rubber Journal

## PROFESSIONAL EXPERIENCE

TARBIAT MODARES UNIVERSITY  
Tehran, Iran

2015-Current

*Head of the Faculty of Chemical Engineering*

- Managed all aspects of the faculty including three major specialties (Chemical Engineering, Polymer Engineering, and Biotechnology) in six organizational departments.

2010-Current

*Associate Professor, Polymer Engineering Department*

- Taught courses in Polymer Engineering discipline
  - Engineering Properties of Solid Polymers (MS)
  - Design and Technology of Elastomeric Components (MS)

- Polymerization Process Engineering (MS)
  - Micromechanics of Particulate-Filled Polymer Composites (PhD)
  - Advised Polymer Engineering students of MS and Ph.D. programs
  - Researched in science and technology of polymeric material, especially elastomers
- 2009-2014      *Head of Polymer Engineering Department*
- Managed educational, research, and administrative tasks of the department
- 2005-2010      Assistant Professor, Polymer Engineering Department
- Similar job description as associate professor
- 1999-2005      THE GOODYEAR TIRE & RUBBER COMPANY  
Akron, Ohio  
*Senior Research Engineer, Mechanics of Material*
- Designed and analyzed numerical models for rubber surface physics (friction, abrasion, contact and rolling problems) and bulk mechanics (stress/deformation, fracture, and fatigue) research projects
  - Performed experimental studies on friction and abrasion of rubber materials
  - Researched fracture and durability problems for polymeric materials
  - Managed friction/abrasion physics laboratory
- 1994-2000      THE UNIVERSITY OF AKRON
- Teaching Assistant: Problem solving in Continuum Mechanics, Mechanics of Materials, and Finite Element Analysis classes
- 1988-1993      IRAN TIRE MANUFACTURING CO. (The Erstwhile General Tire Co.)  
Tehran, Iran  
*Rubber Compounding Engineer and Supervisor of Mixing and Compounding Laboratory.*
- Designed rubber compounds for tires and other products.
  - Established curing specifications.
  - Taught courses in compounding and processing of rubber
  - Involved in trouble shooting of product lines especially mixing, extrusion, and calendaring processes.
  - Managed the compounding and mixing laboratory.
  - Involved in research and development projects and their performance in the product lines.

## SKILLS

- Modeling by Finite Element Analysis applying ABAQUS
- Languages: Fluent in Farsi (Persian) and English

Others:

- Research and analysis.
- Management and coordination.
- Personal and team work skills (good at one-to-one relationships with peers and superiors).

**ADVISED  
STUDENTS**

- Master's Students: 28 graduated, 4 current
- Ph.D. Students: 5 graduated, 3 current

**CERTIFIED  
PATENTS**

1-Design and Construction of a Polymer Tribometer for Research and Practical Applications

2-Design and Construction of a Rolling Pendulum for Measurements of Energy Dissipation in Rubber

**INDUSTRIAL AND  
APPLIED PROJECTS**

- 1- Improving Rolling Resistance, Traction, and Wear of Tire Tread Vulcanizates with Controlling Silanization Process and Bound Rubber Content (Barez Tire Industrial Group, Current)
- 2- Investigating the Effect of Lubricants on Friction Coefficient of Tire Tread Vulcanizates in order to Control the Traction of Automobiles on the Roads (Ministry of Road and Traffics, 2016 )
- 3- Design and Construction of a Rolling Pendulum for Measurements of Energy Dissipation in Rubber (Tarbiat Modares University, 2013)
- 4- Preparing SBR Nano-composites containing Nano-clay (Bandar Imam Petrochemical Company, 2010)
- 5- Design and Construction of a Polymer Tribometer (Tarbiat Modares University, 2008)
- 6- Mechanical Reinforcement of Tire Tread Compounds with Aramid Short Fibers (Iran Tire Company, 2007)
- 7- Improving Mechanical and Permeability Behavior of Butyl Nano-composites ( Ministry of Science, Research, and Technology, 2006)
- 8- Analyzing Road Surface Roughness (Asphalt & Concrete) to Correlate it with Friction and Wear Characteristics of Tire Tread Compounds (Goodyear Tire & Rubber, 2005)
- 9- Prediction and Improvement of Tire Wear (Goodyear Tire & Rubber Company, 2002)
- 10- Failure Analysis of Rubber (Goodyear Tire & Rubber Company. 2001)

## JOURNAL PUBLICATIONS:

1. M Alimardani, M Razzaghi-Kashani, T Koch, *Crack growth resistance in rubber composites with controlled Interface bonding and interphase content*, Journal of Polymer Research 26 (2), 47 (2019)
2. M. Panahi-Sarmad, E. Chehrazi, M. Noroozi, M. Raef, M. Razzaghi-Kashani, *M-A Haghghat Baian, Tuning the surface chemistry of graphene oxide for enhanced dielectric and actuated performance of silicone rubber composites*, ACS Applied Electronic Materials, (2019)
3. SM Hosseini, M. Razzaghi-Kashani, *Catalytic and networking effects of carbon black on the kinetics and conversion of sulfur vulcanization in styrene butadiene rubber*, Soft matter 14 (45), 9194-9208 (2018)
4. Panahi-Sarmad, M Razzaghi-Kashani, *Actuation behavior of PDMS dielectric elastomer composites containing optimized graphene oxide*, Smart Materials and Structures 27 (8), 085021(2018)
5. S Yadollahi, M Ramezani, M Razzaghi-Kashani, AR Bahramian, *Nonlinear viscoelastic dissipation in vulcanizates containing carbon black and silanized silics hybrid fillers*, Rubber Chemistry and Technology, 91 (3), 537-547 (2018)
6. M-R Pourhosseini, M. Razzaghi-Kashani, S-M Emrani, *The Effect of JP4 on Friction between NBR and Aluminum in Different Roughness*, Journal of Applied Research in Chemical-Polymer Engineering, 2 (1), 19-29 (2018)
7. M Sadroddini, M Razzaghi-Kashani, M Miranzadeh, MZ Kassae, *Controlling dielectric permittivity and dielectric loss by starch-coated silver nanoparticles in ethylene-propylene rubber*, Polymer Composites 39 (4), 1303-1310 (2018)
8. F Tavassoli, M Razzaghi-Kashani, B Mohebby, *Hydrothermally treated wood as reinforcing filler for natural rubber bio-composites*, Journal of Polymer Research 25 (1), 3 (2018)
9. Javadi S, Panahi-Sarmad M., Razzaghi-Kashani M., *Interfacial and Dielectric Behavior of Polymer Nanocomposites: Effects of Chain Stiffness and Cohesive Energy Density*, Polymer, 145, 31-40 (2018)
10. Hosseini S-M, Razzaghi-Kashani M., *On the role of nano-silica in the kinetics of peroxide vulcanization of ethylene propylene diene rubber*, Polymer, 133, 8-19 (2017)
11. Tavassoli F., Razzaghi-Kashani M., Mohebby B., *Hydrothermally Treated Wood as Reinforcing Filler for Natural Rubber Bio-composites*, Journal of Polymer Research, In Publication (2017)
12. Alimardani M., Razzaghi-Kashani M., Ghoreishi M-H., *Prediction of Mechanical and Fracture Properties of Rubber Composites by Microstructural Modeling of Polymer-Filler Interfacial Effects*, Materials and Design, 115, 348-354 (2017).
13. Feshanjerdi M, Khorrami M, Masoudi AA, Razzaghi-Kashani M, *The Hysteretic Contribution of Friction for the Polished Rubber on the Concrete Surface*, Applied Surface Science 394, 528-533 (2017)

14. Hosseini S-M, Torbatifard N, Kiani H, Razzaghi-Kashani M, *Comparative role of Interface in reinforcing mechanisms of Nano-silica modified by Silanes and liquid rubber in SBR composites*, Journal of Polymer Research, 23:203 (2016)
15. Mahtabani A-H, Alimardani M, Razzaghi-Kashani M, *Further Evidence of Filler-Filler Mechanical Engagement in Rubber Compounds Filled with Silica Treated by Long-Chain Silane*, Accepted in Rubber Chemistry and Technology (2016)
16. Alimardani M., Razzaghi-Kashani M., Karimi R., Mahtabani, *Contribution of Mechanical Engagement and Energetic Interaction In Reinforcement of SBR-Silane-Treated-Silica Composites*, Rubber Chemistry and Technology, 89, 2,292-305 (2016)
17. Saddrodini M., Razzaghi-Kashani M., Miranzadeh M., Kasae M., *Controlling dielectric permittivity and dielectric loss by starch-coated silver nanoparticles in ethylene-propylene rubber*, Polymer Composites, In Publication (2016)
18. Miranzadeh M., Kasae M., Razzaghi-Kashani M., Sadroddini M., *Antibacterial Ethylene Propylene Rubber Impregnated with Silver Nanopowder: AgNP@EPR*, Advanced Functional Materials, (2016)
19. Razzaghi-Kashani M., Samadi A., *Physical–mechanical properties of carbon black–nanoclay composites of butyl rubber as curing bladder compounds*, Plastics, Rubber and Composites, 44, 7, 253-258 (2015)
20. Alimardani M., Razzaghi-Kashani M., Ghoreishy M H-R, *Comparing the Capillary Rise Technique and Sessile Drop of Non-Porous Surfaces in Determining Surface Energy of Reinforcing Powders Utilized in Polymer Composites*, Science and Engineering of Surface, 27, 81-92 (2016).
21. Javadi S., Razzaghi-Kashani M., Reis P N B, Balado A A, *Interfacial Effects on Dielectric Properties of Polymethylmethacrylate-Titania Microcomposites and Nanocomposites*, In Publication, Polymer Composites (2015)
22. Javadi S., Sadroddini M, Razzaghi-Kashani M., Reis P N B, Balado A A, *Interfacial effects on dielectric properties of ethylene propylene rubber–titania nano- and micro-composites*, Journal of Polymer Research, 22, 162 (2015)
23. Mahboudi R, Bahramian A-R, Razzaghi Kashani M, *The effect of novolac and graphite polycrystal on acetone diffusion and thermal resistance of nanocomposites based on nitril rubber*, Iranian Journal of Polymer Science and Technology, vol. 28, No. 1, (2015).
24. Faramarzi I, Razzaghi-Kashani M, *Improvements in tribological properties of polyamide 6 by application of aramid pulp*, Iranian Polymer Journal, 24:329–335 (2015)
25. Faramarzi I, Razzaghi-Kashani M, *Mechanism of Improvement in Tribological Properties of Polyamide 6 by Addition of Irradiated Polytetrafluoroethylene Powder*, Iranian Journal of Polymer Science and Technology, 27, 6, 403-412 (2015)
26. Hosseini M, Razzaghi-Kashani M., *Vulcanization Kinetics of Nano-silica Filled Styrene Butadiene Rubber*, **Polymer**, 55, 6426-6434, (2014).
27. Pourhosseiny M-R, Razzaghi-Kashani M., *Effect of silica particle size on*

*chain dynamics and frictional properties of styrene butadiene rubber nano and micro composites*, **Polymer** 55, 2279-2284, (2014).

28. Samadi A., Razzaghi-Kashani M., M-H-N Famili, *Design, Construction, and Evaluation of a Modified Rolling Pendulum to Measure the Energy Dissipation in Rubber*, *Polymer Testing* 35, 56–61, (2014).
29. Reza Akhlaghi, Ahmad Reza Bahramian and Mehdi Razzaghi Kashani, *The Effect of Graphite Nanoparticles on Thermal Stability and Ablation of Phenolic/Carbon Fiber/Graphite Nanocomposites*, *Iranian Journal of Polymer Science and Technology*, Vol. 27, No. 3, 241-249, August-September 2014.
30. Iman Naseri, Ali Kazemi, Ahmad Reza Bahramian, Mehdi Razzaghi Kashani, *Preparation of organic and carbon xerogels using high-temperature–pressure sol–gel polymerization*, *Materials and Design* 61 (2014) 35–40.
31. Vahabodin Goodarzi, Mehrdad Kokabi, Mehdi Razzaghi Kashani, Ahmad Reza Bahramian, *Prediction of Long-Term Mechanical Properties of PVDF/BaTiO<sub>3</sub> Nanocomposite*, *Journal of applied polymer science*, 2014, 131, 40596.
32. Mansourirad M., Razzaghi-Kashani M., Mousavi M., "Biological Reclaiming of Recycled Rubber and Its Effect on Mechanical Properties of Rubber Composites", *Iranian Journal of Polymer Science and Technology*, In Publication, (2014).
33. Razzaghi-Kashani M, Samadi A., "Physical-Mechanical Properties of Carbon Black-Nanoclay Composites of Butyl Rubber as Curing Bladder Compounds", *Plastics, Rubber, and Composites*, Submitted, (2013).
34. Arab-Bafrani M-R, Razzaghi-Kashani M, "Simulation of Rubber Friction Using Viscoelastic Behavior of Rubber and Roughness Parameters of Surfaces", *Iranian Journal of Polymer Science and Technology*, 26, 149-158, (2013).
35. Razzaghi-Kashani M., Fakhar, A. M. Mehranpoor "Improvements in Tribological Properties of Polyoxymethelene by Aramid Short Fiber and Polytetrafluoroethylene", *Iranian Polymer Journal*, 22, 53-59 (2013).
36. Sepehri A., Razzaghi-Kashani M., Ghoreishy, M.H.R., *Vulcanization Kinetics of Butyl Rubber-Clay Nano-composites and Its dependence on Clay Microstructure*", *Journal of Applied Polymer Science*, 125, E204–E213 (2012).
37. Pourhosseiny M-R, Razzaghi-Kashani M., "Nanocomposite of SBR/Hydroxyl-terminated Polybutadiene Grafted- Fumed Silica", *Iranian Journal of Polymer Science and Technology*, 25, 103-112 (2012).
38. Salehi M., Razzaghi-Kashani, M., "Comparing Styrene Butadiene Rubber–Clay Nanocomposites Prepared by Melt Intercalation and Latex-Coagulation Methods", *Journal of Applied Polymer Science* 126, 253–259, (2012).
39. Pourhosseiny M-R, Razzaghi-Kashani M., "Nanocomposite of SBR/Hydroxy-terminated Polybutadiene Grafted- Fumed Silica", *Iranian Journal of Polymer Science and Technology*, 25, 103-112 (2012).
40. Razzaghi-Kashani, M., Behazin, E., Fakhar, A. "Construction and Evaluation of a

New Tribometer for Polymers”, *Polymer Testing*, 30, 271-276, (2011).

41. Razzaghi-Kashani M., Esmaeely Nisiany R., “Design, Construction, and Evaluation of Rubber Friction Tester”, *Iranian Journal of Polymer Science and Technology*, 24, 153-164 (2011).
42. Gharavi N, Razzaghi Kashani, M, “The effect of Nanofiller on Electrical and Mechanical Properties of Silicone Rubber”, *International Journal of nanomanufacturing*, 5, 335-3340 (2010).
43. Javadi S., Razzaghi-Kashani M., Gharavi N., “Dielectric Properties of Silicone Rubber-Titanium Dioxide Composites Prepared by Dielectrophoretic Assembly of Filler Particles”, *Smart Materials and Structures*, 19, 035019 (2010).
44. Samadi A., Razzaghi-Kashani M., “Effects of Organo-clay Modifier on Physical-Mechanical Properties of Butyl-Based Rubber Nano-composite”, *Journal of Applied Polymer Science*, 116, 2101-2109 (2010).
45. Gharavi, N, Razzaghi-Kashani, M., Javadi, S., Golshan-Ebrahimi, N., "Effect of Organo-Clay on Relaxation Response of Silicone Rubber Actuators", *Smart Materials and Structures*, 19, 025002 (2010).
46. Salimi F, Vafaie-Sefti M, Razzaghi-Kashani M., “Preparation of Composite Hydrogel Based on Polyacrylamide and the Effect of Kaolinite on its Properties in the Reservoir Conditions”, *Iranian Journal of Polymer Science and Technology*, 22, 2 (2009).
47. Razzaghi-Kashani, M., Gharavi, N., "Effect of Organo-Clay on Dielectric Properties of Silicone Rubber", *Smart Materials and Structures*, 17, 065035, (2008).
48. Razzaghi-Kashani, M. "Aramid-Short-Fiber Reinforced Rubber as a Tire Tread Composite", *Applied Polymer Science*, 113, 1355-1363, (2009).
49. Khanlari, S., Dehghani-Ashkezari, G., Kokabi, M., Razzaghi-Kashani, M., "Fiber Reinforced Nanocomposite Seismic Isolators: Design and Manufacturing", *Polymer Composites*, (2009).
50. Sarami, R., Ebrahimi, N.G., Razzaghi-Kashani, M., "Study of Polypropylene/Polyethylene Terphthalate Blend Fibers Compatibilized with Glycidyl Methacrylate", *Iranian Polymer Journal*, 17, 243-250, (2008).
51. Razzaghi-Kashani M, Hassankhani, H., "Improvement in Physical-Mechanical Properties of Butyl Rubber with Montmorillonite Organoclay" , *Iranian Polymer Journal*, 16, 671-679, (2007)
52. Razzaghi – Kashani M., Padovan J., "Modeling Reinforcement of Rubber with Carbon Black Filler", *Plastics, Rubber and Composites-Macromolecular Engineering*, 36, 47-55 (2007).
53. Gent A. N., Razzaghi Kashani M., Hamed H., “Why Do Cracks Turn Sideways?” *Rubber Chemistry and Technology*, 76, 122 (2003)
54. Gent A.N., Razzaghi Kashani M., “Energy Release Rate for a Crack in a Tilted Block” *Rubber Chemistry and Technology*, 73, 818 (2000)

55. Razzaghi Kashani M., Padovan J., “Simulation of Surface Flaw Propagation Associated with the Mechanical Fatigue Wear of Elastomers”, *Rubber Chemistry and Technology*, 71, 214 (1998).

**DOCTORAL  
DISSERTATION**

A Numerical Approach towards Understanding the Mechanism of Fatigue Wear in Tread Vulcanizates During Rolling of Tires.  
Advisor: Professor Joseph Padovan.

**MASTER'S  
THESIS**

Analytical Simulation of Mechanical Process of Wear for Rubber vulcanizates.  
Advisor: Professor Joseph Padovan.

**MARITAL  
STATUS**

Married with two kids