Gaurav Mago, PhD

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Research Interests

Rheological characterization of thermoplastic polymers, capillary and twin-screw extrusion of polymer nanocomposites, melt and solution processing of polymer nanocomposites, deformation-induced crystallization in polymer nanocomposites, development of novel nanocomposite materials with multifunctional properties, effect of processing on material properties, polymer membranes via immersion precipitation, non-covalent functionalization and interface control of carbon nanotubes, polymer and process research & development for personal care and food/hydrocolloids applications

Education

Ph.D., Department of Mechanical Engineering, Stevens Institute of Technology, Hoboken, NJ, USA, September 2004- January 2009
Effect of processing on structure and property of semi-crystalline polymer nanocomposites
Advisors: Prof. Frank T. Fisher and Prof. Dilhan M. Kalyon

M.S., Department of Chemical Engineering, Indian Institute of Technology (IIT), Kanpur, U.P., India, January 2001- February 2003
Catalytic isomerization of pinane
Advisor: Prof. Deepak Kunzru

B.S., Chemical Engineering (*specialization in polymer technology*), Punjab Technical University (SLIET, longowal), Jalandhar, Punjab, India, September 1997- June 2000

Positions

Senior R&D Engineer (March 2009 – Current)
The Lubrizol Corporation
Avon Lake, OH. 44012 USA

Polymer process research and development of materials with multifunctional properties

Graduate Research Assistant (Sep 2004 – Jan 2009)
Department of Mechanical Engineering
Stevens Institute of Technology, Hoboken, NJ

Studied the effect of processing parameters such as shearing, uniaxial deformation, and temperature on crystallization behavior, morphology and properties of nanocomposites from semi-crystalline polymers (engineering plastics), such as PBT, PVDF, and Nylon-11. Also, developed and used immersion precipitation technique to get PVDF nanocomposite membranes with different porosity and functional properties. Also, developed a new solution processing technique to crystallize the high melting polymers (such as PEEK) from polymer solutions, and generate nano-hybrid shish-kebab structures from nanofibers.

Graduate Research Assistant (January 2001 – February 2003)
Department of Chemical Engineering

Indian Institute of Technology
Kanpur, India

Teaching Assistant (January 2001 – February 2003)
Department of Chemical Engineering
Indian Institute of Technology (IIT)
Kanpur, India
Process Control Lab, Chemical Engineering Thermodynamics, and Chemical Reaction Engineering

Honors/Awards

- Received a **certificate of appreciation and $100 Honorarium award** from NASA Space Center, Florida for reviewing the proposal submitted to EPSCoR program, May 2011 (2011).
- Received **Graduate Student Conference Funding (GSCF) award** from Stevens Institute of Technology for attending American Chemical Society (ACS) meeting, 17-21 August, 2008, Philadelphia, PA (July-2008).
- Received **James H. Potter award** for outstanding performance in PhD program in department of mechanical engineering at Stevens Institute of Technology (May-2008).
- Recipient of **fellowship** from the Ministry of Human Resources and Development (MHRD), Government of India, throughout M.S. program at Indian Institute of Technology, Kanpur, India (2001-2003).

Journal Publications

1. S. F. Bartolucci, **G. Mago**, F. T. Fisher, E. Troiano and D. M. Kalyon (2012), "Unusual fracture surface morphology of fatigued carbon nanofiber/poly(ether ether ketone) composites", *Carbon*, 50, 2347. ***(a figure from this paper was selected to appear on the journal cover)***
2. **G. Mago**, D.M. Kalyon, and S. C. Jana (2011), "***Editorial:*** Special issue on Polymer Nanocomposite Processing, Characterization and Applications 2011", *Journal of Nanomaterials*, vol. 2011, 1, 917474.
3. **G. Mago**, D.M. Kalyon and F.T. Fisher (2011), "Nanocomposites of polyamide-11 incorporated with carbon nanostructures: Development of microstructure and ultimate properties following solution processing", *Journal of Polymer Science: Part B- Polymer Physics*, 49, 1311.
4. **G. Mago**, D.M. Kalyon, S. C. Jana and F.T. Fisher (2010), "***Editorial:*** Special issue on Polymer Nanocomposite Processing, Characterization and Applications 2010", *Journal of Nanomaterials*, vol. 2010, 2, 325807.
5. Shriraj H. Modi, K. Dikovics, H. Gevgilili, **G. Mago**, S.F. Bartolucci, F.T. Fisher and D.M. Kalyon. (2010). " Nanocomposites of poly(ether ether ketone) with carbon nanofibers: Effects of dispersion and thermo-oxidative degradation on development of linear viscoelasticity and crystallinity", *Polymer*, 51, 5236-5244.
6. Rajeev Kumar, **G. Mago**, Venkatesh Balan, and Charles E. Wyman (2009) "Physical and chemical characterizations of corn stover and poplar solids resulting from leading pretreatment technologies", *Bioresource Technology*, 100, 3948-3962.
7. **G. Mago**, D.M. Kalyon and F.T. Fisher (2009), "Hybrid carbon nanofiber-PBT nanostructures produced via crystallization induced functionalization, *Journal of Applied Polymer Science*, 114, 1312-1319.
8. **G. Mago**, F.T. Fisher, and D.M. Kaylon (2008). "Effects of multiwalled carbon nanotubes on the shear-induced crystallization behavior of poly(butylene terephthalate)", *Macromolecules*, 41, 8103.

9. **G. Mago**, F.T. Fisher, and D.M. Kalyon (2009). “Deformation induced crystallization and associated morphology development of carbon nanotube - PVDF nanocomposites”, *Journal of Nanoscience and Nanotechnology*, 9, 3330-3340.
10. **G. Mago**, D.M. Kalyon, and F.T. Fisher (2008). “Membranes of Polyvinylidene fluoride (PVDF) and PVDF nanocomposites with carbon nanotubes via immersion precipitation”, *Journal of Nanomaterials,* 3, 759825.

Conference Publications (peer reviewed)

1. **G. Mago**, D.M. Kalyon, and F.T. Fisher (2010), “Processing-Induced Crystallization of Semi-crystalline Polymer Nanocomposites”, *Proceedings* of SAMPE, Code82480
2. S. Bartolucci, **G. Mago**, H. Gevgilili, S. Vural, K. Dikovics, D.M. Kalyon, and F.T. Fisher. (2010). "Investigation of the properties of PEEK-nanotube composites prepared by solution methods", Proceedings of ASME International Mechanical Engineering Congress, Volume 12, Part A, 279
3. **G. Mago**, D.M. Kalyon, and F.T. Fisher (2008). “Effect of nanoparticles on microstructure and crystallization behavior of Polyvinylidene fluoride (PVDF) and PVDF nanocomposites membranes prepared using immersion precipitation technique”, *Polymeric Materials Science and Engineering: Preprints, 99, 310*
4. **G. Mago**, D.M. Kalyon, and F.T. Fisher (2008). “Crystallization and morphology of carbon nanotube-Nylon-11 nanocomposites”, *Polymeric Materials Science and Engineering: Preprints, 99, 508*
5. **G. Mago**, J. A. Dutreuil, F.T. Fisher, and D.M. Kalyon (2007). “Structural formation in poly (butylene terephthalate) and PBT nanocomposites during uniaxial deformation”, Proceedings of ASME International Mechanical Engineering Congress and Exposition, vol. 11, PART B, 1127
6. **G. Mago**, Carlos Velasco-Santos, Ana L.Martinez-Hernandez, D.M.Kalyon and F.T.Fisher (2008). “Effect of functionalization on crystallization and mechanical properties of MWNT-PBT nanocomposites”, Materials Research Society Symposium Proceedings, vol. 1056, 295
7. **G. Mago**, F.T. Fisher, and D.M. Kalyon (2007). “Effect of shearing on the crystallization behavior of poly(butylene terephthalate) and PBT nanocomposites”, Proceedings of the ASME Materials Division, 2006, 497–506

Conference Presentations

1. D. M. Kalyon, F.T. Fisher and **G. Mago** (2011), “Nanocomposites of polymers compounded with C nanotubes: Effects on crystallization, cross-linking, viscoelasticity and development of ultimate properties”, *MACROMEX 2011-2nd Binational meeting on Advances in Polymer Science*, Riviera Maya, Q. Roo, Mexico
2. F.T. Fisher, **G. Mago**, M. Nie and D.M. Kalyon (2011), “Crystallization Behavior of Semicrystalline Polymer Nanocomposites”, *ASME International Mechanical Engineering Conference and Exposition (IMECE)*, November 11-17, Denver, CO
3. F.T. Fisher, **G. Mago**, M. Nie and D.M. Kalyon (2011), “Leveraging the Crystallization of Semicrystalline Polymer Nanocomposites”, *ASME Applied Mechanics and Materials conference (McMat- 2011),* May 31- June 2, Chicago, IL
4. **G. Mago**, D.M. Kalyon, and F.T. Fisher (2010), “Processing-Induced Crystallization of Semi-crystalline Polymer Nanocomposites”, SAMPE *Proceedings*, May 17-20, Seattle, WA.
5. S. Bartolucci, **G. Mago**, H. Gevgilili, S. Vural, K. Dikovics, F.T. Fisher, and D.M. Kalyon. (2010). " Carbon nanotube-PEEK composites fabricated by solvent methods and melt-mixing: A comparative study", ANTEC Society of Plastics Engineers, May 16-20, Orlando, FL.
6. S. Bartolucci, **G. Mago**, H. Gevgilili, S. Vural, K. Dikovics, D.M. Kalyon, and F.T. Fisher. (2009). "Investigation of the properties of PEEK-nanotube composites prepared by

solution methods", ASME International Mechanical Engineering Conference and Exposition (IMECE), November 13-19, Lake Buena Vista, FL.

7. **G. Mago**, D.M. Kalyon, and F.T. Fisher (2008), "Controllable nanocomposite interface microstructure via polymer crystallization-induced wrapping of carbon nanotubes", *MRS Proceedings*, Fall 2008, December 1-5, Boston, MA
8. **G. Mago**, R. Oelkers, D.M. Kalyon, and F.T. Fisher (2008). "Microstructure and crystallization behavior of Polyvinylidene fluoride (PVDF) nanocomposites prepared using coprecipitation technique", *ASME International Mechanical Engineering Conference and Exposition (IMECE)*, October 31-November 6, Boston, MA.
9. S.F. Bartolucci, **G. Mago**, D.M. Kalyon, and F.T. Fisher (2008). "Mechanical Properties of Carbon Nanotube-PEEK Composites", *ASME International Mechanical Engineering Conference and Exposition (IMECE)*, October 31-November 6, Boston, MA.
10. **G. Mago**, D.M. Kalyon, and F.T. Fisher (2008). "Characterization of crystal morphology and microstructure in semi-crystalline polymer nanocomposites", *ESP Division Topical Conference (TOPCON)-Society of Plastics Engineers*, October 13-14, Wilmington, Delaware
11. **G. Mago**, D.M. Kalyon, and F.T. Fisher (2008). "Crystallization and morphology of carbon nanotube-Nylon-11 nanocomposites", *236th National Meeting & Exposition of the American Chemical Society*, August 17-21, Philadelphia, PA.
12. **G. Mago**, D.M. Kalyon, and F.T. Fisher (2008). "Effect of nanoparticles on microstructure and crystallization behavior of Polyvinylidene fluoride (PVDF) and PVDF nanocomposites membranes prepared using immersion precipitation technique", *236th National Meeting & Exposition of the American Chemical Society*, August 17-21, Philadelphia, PA.
13. **G. Mago**, D.M. Kalyon, and F.T. Fisher (2008). "Polymer crystallization induced wrapping of carbon nanofibers", *Virtual Conference on Nanoscale Science and Technology*, July 24-29, Fayetteville, Arkansas
14. Rajeev Kumar, Venkatesh Balan, **G. Mago**, and Charles E. Wyman (2008) "Access of Cellulase to Cellulose and Lignin for Corn Stover and Poplar Solids Prepared by Leading Pretreatment Technologies", *The 30th Symposium on Biotechnology for Fuels and Chemicals*, May 4-7, 2008, New Orleans, LA
15. **G. Mago**, Carlos Velasco-Santos, Ana L.Martinez-Hernandez, F.T. Fisher and D.M. Kalyon, 2007, "Effect of functionalization on crystallization and mechanical properties of MWNT-PBT nanocomposites", *MRS Proceedings*, Fall 2007, November 26-30, Boston, MA
16. **G. Mago**, F.T. Fisher, and D.M. Kalyon (2007). "Nanoparticle-enhanced processing-induced crystallization of PVDF and PVDF nanocomposites ", *44th Annual Technical Meeting Society of Engineering Science*, October 21–24, 2007, TX
17. **G. Mago**, F.T. Fisher, and D.M. Kalyon (2007). "Effect of shearing on crystallization and morphology of PVDF nanocomposites", *Virtual Conference on Nanoscale Science and Technology*, October 21-25, Fayetteville, Arkansas
18. **G. Mago**, J. A. Dutreuil, F.T. Fisher, and D.M. Kalyon (2007). "Structural formation in poly(butylene terephthalate) and PBT nanocomposites during uniaxial deformation", *ASME International Mechanical Engineering Conference and Exposition (IMECE)*, November 11-15, Seattle, WA
19. **G. Mago**, F.T. Fisher, and D.M. Kalyon (2007). "Nanoparticle-enhanced shear-induced crystallization of semi-crystalline polymer nanocomposites", J*oint ASME/ASCE/SES Conference on Mechanics and Materials (McMAT2007)*, June 3-7, Austin, TX.
20. **G. Mago**, F.T. Fisher, and D.M. Kalyon (2006). "Effect of shearing on the crystallization behavior of poly(butylene terephthalate) and PBT nanocomposites", *ASME International Mechanical Engineering Conference and Exposition (IMECE)*, November 5-10, Chicago, IL.

Skills

- Extensive hands on experience with **Oscillatory rheometer (ARES)**,**Capillary rheometer**, **DSC, XRD, DMA, FTIR, GC/MS, TGA, SEM** and **TEM.**

- Outstanding data processing and strong oral communication skills evidenced by delivery of both technically specialized and general interest presentations.

- Significant experience mentoring undergraduate student researchers in the lab (11 undergraduate researchers total from Summer 2006 through Summer 08, from Mechanical Engineering, Chemistry, Chemical Engineering)

Professional Service

- *Associate Editor*, Journal of Nanomaterials (2010- current)
- Reviewer for research proposals submitted to NASA EPSCoR program, FL, 2011.
- Lead Guest Editor, Journal of Nanomaterials, Special Issue on Polymer Nanocomposite Processing, Characterization, and Applications, published in November-December 2011.
- Lead Guest Editor, Journal of Nanomaterials, Special Issue on Polymer Nanocomposite Processing, Characterization, and Applications, published in November-December 2010 (this special issue was selected to be a ***Focus Special Issue*** of the journal, and will be published every year)
- Reviewer for research proposals submitted to Research Cooperability Program, Unity through Knowledge Fund (UKF), Croatian Ministry of Science, Education and Sports, Croatia, 2010.
- Session chair, "Nanocomposites", 2010 Society of Plastic Engineers annual conference, May 16-20, Orlando, FL.
- Reviewed manuscripts submitted to Society of Plastics Engineers- ANTEC 2010 proceedings, May 16-20, Orlando, FL.
- Have independently reviewed more than **60 journal articles** submitted for publication in: Polymer Chemistry, Carbohydrate Polymers, International Journal of Biomacromolecules, Polymer Testing, Macromolecules, Journal of Applied Polymer Science, Polymer Engineering and Science, Materials Chemistry and Physics, Carbon, Composites Science and Technology, Composites-Part A, e-Polymers, Express Polymers Letters, International Journal of Chemical Engineering, Journal of Coatings Technology and Research, Nanoscale Research Letters and Journal of Nanoscience & Nanotechnology.

Professional Society Affiliations

- Full member, Sigma Xi (The Scientific Research Society)
- member, American Chemical Society
- member, Society of Plastics Engineers
- member, Materials Research Society
- Member, ASME