Xiaomin Tang

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EDUCATION

Carnegie Mellon University Pittsburgh, PA
Doctor of Philosophy in Materials Science and Engineering December 2019
Thesis: Self-Assembled Energy Dissipating Network for Tissue Adhesive Applications
GPA: 3.9/4.0

DongHua University Shanghai, China
Master of Engineering in Textile Engineering April 2014
GPA: 3.6/4.0
Selected Coursework: Textile Physics, Nanocomposite, Modification and Deformation of Textile Materials. Applied Statistics, Fluid Mechanics, Textile Composite Materials Design

SKILLS

Knowledge-based Skills: Polymer Physics, Adhesion, Interface and Surface Interaction, Polymer Synthesis, Polymer Viscoelasticity, Polymer Composite, Polymer Blends, Polymer Blends Compatibilization, Block Copolymer, Phase Separation, Electrospinning
Lab Instrumentation: FT-IR, DMA, DSC, TGA, SEM, TEM, NMR, GPC, Raman, UV-Vis, XRD, SAXS/WAXS, Surface Profilometry, Optical Microscope, Refractometer, Light Scattering Goniometer, Bubble Pressure Tensiometer, Viscometer, Rheometer, Tensile Testing Instrument, Contact Angle Goniometer, Thermal Conductivity Tester, Sound Absorption Tester, Magnetic Testing Instrument
Application Software: Origin, ChemDraw, MATLAB, Adobe Photoshop, LabVIEW, MS Office

EXPERIENCE

Oak Ridge National Laboratory, Oak Ridge, TN
Research Associate – Polymer Processing and Characterization February 2020 -
Plastic packaging Blends Upcycling

- Studying the change of the interfacial structure of the compatibilized PE/PET as functions of the compatibilizer chemistry and architecture using TEM and neutron scattering
- Investigating the structure-property relation between the compatibilized blend interface with the bulk mechanical property
- Synthesizing a deuterated PET polymer for neutron scattering experiment

THESISES of PhD and MASTER

Carnegie Mellon University, Pittsburgh, PA August 2015 - December 2019
Self-Assembled Energy Dissipating Network for Tissue Adhesive Applications

- Designed a triblock copolymer for the project by combining atom transfer radical polymerization and esterification
- Produced a self-assembled robust hydro-film with the toughness several orders higher than traditional networks by studying the triblock copolymer phase separation behavior and determining the key factor for the robustness
- Investigated how dynamic bonds contribute to dissipation by performing small amplitude oscillatory, tensile cyclic tests, and data fitting
- Constructed a burst pressure apparatus to evaluate the in-vitro sealing performance of the adhesive
- Designing thickness dependent probe adhesion tests to quantitively understand interface adhesion and dissipation adhesion

Donghua University, Shanghai, China September 2011- April 2014
Controllable Wettability of Poly(m-phenylene isophthalamide) Nanofibrous Membrane for Oil/Water Separation

- Produced fluorinated benzoxafluoro/SiO_2 nanoparticles mixture to optimize surface wettability of electrospun membranes and their porous structure that enables a superior flux of 3311 L m^{-2} h^{-1}, compared to that of commercial UF filtration with a flux less than 300 L m^{-2} h^{-1}
- Designed a subtract using poly(m-phenylene isophthalamide) (PMIA) that endows the membrane with high thermal stability (350°C), good repellency to hot water (80 ^{o}C), and stability towards PH (2-12)

- Designed and performed the fabrications (synthesis of benzoxafluoro, electrospinning of PMIA membrane, surface modification) and characterizations (FE-SEM, NMR, FT-IR, Contact angle goniometer, profilometry, tensile tester)
- Analyzed the data, produced the figures (Origin, Visio) and wrote the draft for publication

RESEARCH PROJECT

Carnegie Mellon University, Pittsburgh, PA October 2018 –September 2019

Next-generation brain-machine devices

- Designing and synthesizing a polymer that enables the dopamine hydrochloride substitution as high as 80% for use in the robust neuron adhesive application

Donghua University, Shanghai, China November 2012 – June 2014

Three-Dimensional Nanofiber-Based Aerogels with Superelasticity

- Developed a freeze-shaping technique to successfully reconstruct the traditional 2-dimensional electrospinning membrane into 3-dimensional stable bounded elastic cellular structure as a part of a team five
- Processed fibrous aerogels through electrospinning, homogenization freeze-dying and crosslinking
- Created a hang-on mold to successfully produce the lowest density aerogel of 0.12 mg cm^{-3}
- Conducted and analyzed cyclic compressive tests to show the superelasticity of fibrous aerogels

Donghua University, Shanghai, China April 2013 – December 2013

Flexible Magnetic SiO_2@γ-Fe_2O_3 Nanofibrous Membranes

- Prepared silica nanofibrous membranes by electrospinning and calcination
- Operated FT-IR, XRD, FE-SEM, TEM and EDX elemental mapping to show the structure of the membrane before and after the benzoxazine and ferric acetylacetonate modification and the distribution of γ-Fe_2O_3 on the fibers

PUBLICATION

Xiaomin Tang, Bingqing Wang, Sophia Eristoff, Han Zhang, Christopher J. Bettinger. " Dynamic contributions to the bulk mechanical properties of self-assembled polymer networks with reconfigurable bonds." ***Macromolecular Rapid Communications***, 2020, 41(3): 1900551.

Xiaomin Tang, Christopher J. Bettinger. " Multimodal Underwater Adhesion Using Self-Assembled Dopa-Bearing ABA Triblock Copolymer Networks." ***Journal of Materials Chemistry B***, 2018, 6: 545-549.

Xiaomin Tang, Yang Si, Jianlong Ge, Bin Ding, L. Liu, et al. " In-Situ Polymerized Superhydrophobic and Superoleophilic Nanofibrous Membranes for Gravity Driven Oil–Water Separation." ***Nanoscale***, 2013, 5 (23):11657-11664. (Featured as hot article of Nanoscale)

Yang Si, Jianyong Yu, **Xiaomin Tang**, Jianlong Ge, Bin Ding. " Ultralight Nanofiber-Assembled Cellular Aerogels with Superelasticity and Multifunctionality." ***Nature Communication,*** 2014, 5, 5802.

Yang Si, **Xiaomin Tang**, Jianlong Ge, Bin Ding. " In-Situ Synthesis of Flexible Magnetic SiO_2@γ-Fe_2O_3 Nanofibrous Membranes." ***Nanoscale,*** 2014, 6 (4):2102-2105.

Meilin Huang, Yang Si, **Xiaomin Tang**, Bin Ding, et al. " Gravity Driven Separation of Emulsified Oil/Water Mixtures Utilizing in Situ Polymerized Superhydrophobic and Superoleophilic Nanofibrous Membranes." ***Journal of Materials Chemistry A,*** 2013, 1 (45):14071-14074. (Featured as **cover work**)

Lu Han, Michelle Lehmann, Jiadeng Zhu, Tianyi Liu, Zhengping Zhou, **Xiaomin Tang**, Chien-Te Hsieh, Alexei P Sokolov, Pengfei Cao, Xi Chen, Tomonori Saito. "Recent Developments and Challenges in Hybrid Solid Electrolytes for Lithium-Ion Batteries." ***Frontiers in Energy Research***, 2020, Accepted.

PATENT

Bin Ding, Yang Si, Jianlong Ge, **Xiaomin Tang**, et al. " Three Dimensional Fiber-Based Aerogel Tissue Engineering Scaffold And Preparation Method." CN103285424B, Filed September 2013, and Issued June 2016.

Bin Ding, **Xiaomin Tang**, Yang Si, Jianlong Ge, et al. " Three Dimensional Carbon Fiber-Based Aerogels and Their Fabrication." CN103265010B, Filed August 2013, and Issued January 2015.