Exponent®
Engineering & Scientific Consulting

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Professional Profile

Specialized in polymer engineering, additive manufacturing, and the design of high-performance polymer nanocomposites, Dr. Bu's expertise lies in the areas of thermoplastic elastomers, polymer-metal hybrid materials, and 3D-printable formulations for flexible electronics, energy storage, and thermal management. His doctoral research focused on the formulation, rheological analysis and process optimization of nanocomposite feedstocks for extrusion-based additive manufacturing. He also developed printable systems integrating low-melting-point-metals and elastomeric matrices for multifunctional material platforms.

Dr. Bu is well versed in various material characterization techniques including scanning electron microscopy (SEM), transmission electron microscopy (TEM), atomic force microscopy (AFM), dynamic mechanical analysis (DMA), differential scanning calorimetry (DSC), rheometer, laser flash apparatus (LFA). He is also proficient in interfacial design, structure-property correlation, and performance optimization for nanocomposite materials and soft-matter systems.

Prior to joining Exponent, Dr. Bu conducted doctoral research at the School of Polymer Science and Polymer Engineering at University of Akron, where he led projects on polymer nanocomposites and functional elastomers. His work contributed to the development of next-generation materials with tunable mechanical, thermal, and electrical properties suitable for emerging applications in soft electronics and energy systems.

Academic Credentials & Professional Honors

Ph.D., Polymer Engineering, University of Akron, 2025

M.S., Chemical Engineering, University of Rochester, 2019

Publications

Yang M, Bu J, Shen N, Liu S, Xu W. Design and additive manufacturing of polyethylene-based hierarchical composites by selective laser sintering. Adv. Mater. Technol. 2025; 10(3):2400890.

Tsai CH, Shen N, Mi C, Bu J, Dong Y, Xu W. Designed polymer ligands for perovskite quantum dots and their block copolymer nanocomposites. Adv. Opt. Mater. 2024; 12(13):2302731.

Kasbe PS, Bosch J, Bu J, DellaCorte C, Xu W. Scalable generation of hybrid graphene nanoscrolls for high-performance solid lubricants. Tribol Lett 2024; 72(1):20.

Yang M, Kasbe PS, Bu J, Xu W. scalable solid-state synthesis of 2d transition metal oxide/graphene

hybrid materials and their utilization for microsupercapacitors. Nanoscale 2024; 16(17):8390–8400.

Kasbe P, Yang M, Bosch J, Bu J, DellaCorte C, Xu W. Two-dimensional iron oxide/graphene-based nanocomposites as high-performance solid lubricants. 2D Mater. 2024; 11(4):045005.

Bu J, Shen N, Qin Z, Xu W. Integration of low-melting-point alloys and thermoplastic elastomers for 3d printing of multifunctional composites. Cell Reports Physical Science 2023; 4(10):101604.

Shen N, Bu J, Prévôt ME, Hegmann T, Kennedy JP, Xu W. Macromolecular engineering and additive manufacturing of polyisobutylene-based thermoplastic elastomers. II. The Poly(styrene-b-isobutylene-b-styrene)/Poly(phenylene oxide) system. Macromol. Rapid Commun. 2023; 44(1):2200109.

Luo X, Yang M, Bu J, Chen T, Yi A, Xu W. Precise fabrication of nanostructured mixed metal oxides by the integration of nanoimprinting and sol–gel synthesis. Macromol. Res. 2023; 31(8):795–803.

Presentations

Bu J, Shen N, Qin Z, Xu W. Integration of low-melting-point alloys and thermoplastic elastomers for 3d printing of multifunctional composites. Oral presentation, MS&T 2024 technical meeting and exhibition, Pittsburg, PA, 2024.

Bu J, Shen N, Xu W. Additive manufacturing of multifunctional polymer-metal composite with tunable internal structure and physical properties. Oral presentation, Microscopy Society of Northeast Ohio/ACS Akron section 66th Annual Conference, University Heights, OH, 2024.

Bu J, Yang M, Xu W. hybrid nanostructures with liquid metal core and polymer/carbon shell for flexible energy storage and electronics. Poster presentation, National Graduate Research Polymer Conference, Ann Arbor, MI, 2023.