MD REZOANUR RAHMAN

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Professional Summary

Experimental materials scientist and textile engineer with end-to-end research experience. Doctoral researcher focuses on phonon and electronic engineering of thermoelectric generators. Skills on recycle polymer synthesis, filament manufacturing, neutron scattering, biomedical device (hyperthermia), flexible devices, textile products. Rigorous experimental design, hands-on synthesis experiences, multi-instruments characterization, and clear communication of results to academic and industry stakeholders.

Interpersonal Skills

Collaboration & teamwork; Communication (written & verbal); Leadership & initiative; Problem solving & critical thinking; Stakeholder management; Mentoring & coaching; Time & priority management; Adaptability & flexibility; Attention to detail & quality; Continuous improvement; Professional integrity & ethics; Cross-cultural communication; Conflict resolution & negotiation; Data management; Customer/end-user focus; Positive attitude.

Areas of Expertise

- Thermoelectric materials & phonon engineering (bulk & flexible composites).
- Soft materials & wearable composites; textile surface modification & property testing.
- Chemical polymer processing: solution casting, in-situ polymerization, blending, compounding, curing, crosslinking, dispersion and compatibilizers.
- Magnetic hyperthermia materials & testing, nanoparticle synthesis, selection and safety considerations.
- Thermal & electrical transport properties.
- Microstructure and phase analysis.
- Filament manufacturing (recyclable plastic-waste management) for 3D printing.

Fabrication & Processing

- Liquid phase exfoliation on nanoparticles.
- In-situ polymerization synthesis for nanocomposites.
- Nano-porous metal oxide powder preparation using the polymer micelle self-assembly method.
- The basic idea of spin coating, doctor blade, and dip coating methods.
- Ball milling for grinding nanotubes into extremely fine powders.
- Sample Cutting, and polishing with Struers Accutom-50 machine
- Sample coating as preparation for SEM analysis with Edwards Sputter Coater.
- Separate or concentrate materials suspended in a liquid medium (centrifugation).
- Pulsed laser deposition (PLD) for manufacturing thin film using high-energy laser pulses to vaporize the surface of a solid target inside a vacuum chamber and condense the vapor on a substrate
- Spark plasma sintering (SPS) is used to fabricate dense and homogeneous bulk materials from powders using direct heating of the pressing tool and/or the sample by pulsed direct electrical current with low voltage.
- Manufacturing thermally and conducting filament using recyclable polymer by 3Devo precision filament extruder.

Characterization & Testing

- Crystallographic analysis of material by X-ray diffraction (XRD): lattice parameter, crystal size calculation, and grain size calculation.
- Rietveld refinement analysis of crystalline materials by using Fullprof software.
- Nano- and microstructure analysis by scanning electron microscopy (SEM)
- Element analysis by energy-dispersive X-ray spectroscopy analysis (EDS)

- Result analysis skills of the transmission electron microscope (TEM) analysis
- Expert in electrical conductivity and Seebeck coefficient measurement
- Expert in thermal diffusivity measurement by laser false analysis (LFA)
- Specific heat measurement using differential scanning calorimetry (DSC).
- Expert in thermal conductivity measurement of thin film using PicoTR
- Neutron scattering (ANSTO): phonon DOS/GDOS awareness, experiment planning & sample logistics
- Micro-CT (polymers/composites): porosity, dispersion, 3D morphology/segmentation
- XRD crystallography; Rietveld (FullProf), SEM/EDS; TEM result interpretation
- Textile testing: moisture regain, spray rating, WV permeability (cup), tensile (ASTM D5034), abrasion/pilling, crease-recovery.

Professional Experience

1. ***Research Assistant, University of Wollongong, Wollongong, NSW (2020, 2022, 2024, 2025-Continue)***

- Prototyped flexible thermoelectric and polymer-based composites for wearable energy devices. Prepared flexible samples via hot-pressing/lamination and adhesive bonding.
- Characterized materials using SEM/EDS, XRD, DSC and LFA. Compiled test reports to inform design decisions and manufacturability considerations.
- Coordinated with supervisors, technicians, and partner labs (ANSTO/CSIRO) to plan experiments, manage samples, and meet project timelines.
- Produced experimental and analysis reports and presented findings to supervisors and project stakeholders.
- Developed test plans, SOPs, and risk assessments, and maintained data control and ensured reproducible workflows across instruments.
- Built and optimized lab fixtures for thermal/electrical measurements and performed troubleshooting and iterative design to improve signal quality and throughput.
- Conducted literature reviews and benchmarking to frame hypotheses, refine experimental parameters, and position results against the state-of-the-art.
- Wrote analysis reports and data visualizations (Python/Origin) for batch processing, plotting, and uncertainty estimation; maintained clean data repositories.
- Trained and mentored junior students on instrument operation, safe lab practices, and data interpretation, and supported day-to-day lab activities.
- Managed procurement and vendor liaison for consumables and specialty materials, and scheduled instrument calibrations and routine maintenance.
- Contributed to posters, manuscripts, and internal reports; assisted with figure preparation, methods documentation, and responding to reviewer feedback.
- Prepared SPS sample, coordinated shipments and documentation, and ensured WHS/ethics compliance across project activities.

2. ***Casual Teaching Staff, University of Wollongong, Wollongong, NSW (2025-Present)***

- Led classes and tutorials, demonstrating instruments and supervising safe sample prep, measurement, and data recording.
- Marked lab reports and assignments against rubrics, providing timely, constructive feedback and moderating grades for consistency.
- Supported students via consultation hours and LMS (Moodle) announcements, clarifying concepts, assessment requirements, and good academic practice.
- Marking Exam papers and liaising with the academic coordinator to ensure smooth class delivery and compliance with WHS.

3. ***Management Trainee Officer, Biochem International, Dhaka, Bangladesh (2019)***

- Coordinated planning, administration, and logistics across product lines; liaised with suppliers and internal stakeholders to keep schedules and inventory on track.

- Managed vendor and client communications maintained accurate logs and follow-ups and resolved day-to-day supply issues promptly.
- Produced weekly KPI, inventory, and variance reports for senior management, improving operational visibility and decision-making.

4. ***Textile Engineering Internship, H.R. Textile Mills Ltd (Pride Group), Savar, Dhaka (Mar - Apr 2018)***

- End-to-end manufacturing exposure: practical insight into spinning, knitting, weaving, dyeing, finishing, and cut-and-sew lines. How to pick parameters (pick density, tension, liquor ratio, and curing temp) that affect fabric hand and performance.
- Process control & quality systems: applying AQL/SPC, GSM and shrinkage checks; shade; fastness testing; defect mapping; and root-cause analysis to reduce rejects and rework.
- Machine know-how & maintenance basics: setting loom, knit machine parameters, nozzle, jet settings, stenter, compactor adjustments, and learning preventive maintenance and changeover routines.
- Production planning & supply-chain awareness: reading tech packs, understanding lead times, costing trade-offs, and coordinating with merchandisers, dye houses, and suppliers.
- Safety, sustainability & professional skills: WHS/5S, chemical management, wastewater and energy awareness, plus on-floor communication with operators, technicians, and concise reporting.

Journal Articles

1. https://doi.org/10.1016/j.jmmm.2023.170859
2. https://doi.org/10.1063/5.0173675
3. https://doi.org/10.1016/j.ijhydene.2021.12.135
4. https://doi.org/10.1016/j.apsusc.2021.151068
5. https://doi.org/10.1002/aelm.202100802
6. https://doi.org/10.1016/j.dib.2021.107674
7. https://doi.org/10.1063/5.0292504

Education

1. ***PhD, Materials Engineering (2022-2026)***

- **University of Wollongong, Australia**
  Thesis: Phonon and Electronic Engineering of Carbon-Modified Mg_2Si: Toward Ultra-Low κ_L in Thermoelectric Materials.

2. ***MPhil, Materials Engineering (2020-2022)***

- **University of Wollongong, Australia**
  Thesis: Engineering thermal conductivity in functional materials using chemical doping and nanoparticle additives

3. ***BSc, Textile Engineering (2013-2018)***

- **Mawlana Bhasani Science & Technology University (MBSTU), Bangladesh**
  Thesis: Surface modification of 100% polyester woven fabric by PVA to enhance physical properties.

Publications & Profiles

- ***Google Scholar***: https://scholar.google.com/citations?user=mVl-F_oAAAAJ&hl=en&authuser=1
- ***LinkedIn***: https://www.linkedin.com/in/md-rezoanur-rahman-4ba60b212/

Certifications, Training & Awards

- Best Poster - 46th Annual Condensed Matter & Materials Meeting (Wagga 2024).

- University Postgraduate Award (UOW).
- International Postgraduate Tuition Awards (IPTA) (Session—Autumn 2021)
- International Postgraduate Tuition Awards (IPTA) (Session—Spring 2021)
- Graphics Design-Dimension IT & Software (2018).
- Planning, Administration & Management - Graduate Training Institute, BAU (2017).
- Industrial Internship-H.R. Textile Mills Ltd. (2018).

Affiliation & Membership

- Commonwealth Scientific and Industrial Research Organization (CSIRO), Manufacturing Unit, Clayton, Melbourne, Australia
- Member of FLEET (ARC Centre of Excellence in Future Low-Energy Electronics Technologies)
- Member of the Australian Institute of Physics (AIP)
- Member of Engineer Australia (EA)

Referees

References available on request