GUOXUN ZHONG

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RESEARCH PROFILE

MSc materials science student at NTU with hands-on research experience in solid polymer electrolytes, DLP photopolymerisation, polymer formulation, rheology, tensile testing and FTIR-ATR. Interested in rechargeable-battery electrolytes, electrode-electrolyte interphases, electrochemical materials and experimental materials characterisation. Previous undergraduate research linked electrolyte composition, printability, molecular structure, mechanical performance and room-temperature ionic conductivity.

EDUCATION

Nanyang Technological University (NTU), Singapore
MSc, Materials Science and Engineering (Applied Materials Analytics) — **Aug 2026 - Jul 2027 (expected)**

- Selected study areas: materials laboratory techniques; chemical and physical analysis of materials; semiconductor packaging and failure-analysis fundamentals.

Loughborough University, United Kingdom
BEng, Materials Science and Engineering | Upper Second-Class Honours (2:1), 68.6% — **Sep 2024 - Jun 2026**

- Award: LCMP First-Year Prize - ranked 1st of 10 students in the programme.

Yanshan University, China
BEng, Metal Materials Engineering — **Sep 2022 - Jun 2026**

RESEARCH EXPERIENCE

DLP 3D Printing of PEGDA/LiTFSI/ACMO Solid Polymer Electrolytes — **Sep 2025 - Jun 2026**
Undergraduate Dissertation | Department of Materials, Loughborough University

- Designed a two-stage formulation study to balance printability, mechanical performance and ionic conductivity: first varied LiTFSI from 0-20 wt%, then incorporated 10-30 wt% ACMO into the selected base formulation.
- Prepared moisture-sensitive electrolyte precursors in an Ar-filled glovebox, homogenised formulations, and fabricated tensile and disk specimens by DLP 3D printing.
- Performed rheometry, Jacobs working-curve photocuring analysis, tensile testing and FTIR-ATR; integrated room-temperature ionic-conductivity results from EIS measurements provided by a collaborator.
- Identified 15 wt% LiTFSI as the best-balanced base composition; the 10 wt% ACMO formulation reached 0.81 MPa UTS and 4.52 × 10^{-4} S·cm^{-1} ionic conductivity while retaining DLP processability.
- Linked macroscopic trends to Li^{+}-ether coordination, trans-to-gauche conformational change and salt-induced plasticisation using FTIR evidence, while explicitly identifying measurement limits and follow-up experiments (Raman/high-resolution FTIR, DSC and long-term electrochemical testing).

ENGINEERING / INDUSTRY EXPERIENCE

Xianhu Laboratory, Foshan, China
Numerical Simulation Research Intern | R&D Centre for Lightweight Forming Technology — **Jun 2025 - Sep 2025**

- Investigated stress concentration and cracking risk in an industrial metal-extrusion container using equipment-based geometry and 2D/3D finite-element models.
- Evaluated interference-fit and heating-hole design parameters using ANSYS Workbench and SolidWorks; used MATLAB to compare configurations and visualise peak-stress trends.
- Identified an improved configuration that reduced simulated maximum equivalent stress by approximately 300 MPa (28.3%) relative to the baseline design.

SELECTED MATERIALS CHARACTERISATION TRAINING

- Hands-on / project use: FTIR-ATR, rotational rheometry, tensile testing, DLP photopolymerisation, controlled resin formulation and glovebox handling.
- Graduate course-laboratory exposure: SEM imaging and interpretation, powder XRD phase matching and DSC thermal analysis

TECHNICAL SKILLS

Experimental: polymer/electrolyte formulation; DLP 3D printing; rheology; tensile testing; FTIR-ATR; sample preparation; experimental design; literature review; technical reporting.

Analysis & engineering: ANSYS Workbench; SolidWorks; MATLAB; Origin; R; finite-element analysis; regression and data visualisation.

Languages: Mandarin Chinese (native); English (IELTS 6.5).