

Ruolan Fan

Amherst, MA - 01002

Phone 413-210-4933 Email rfan@umass.edu

LinkedIn - www.linkedin.com/in/ruolan-f-042b72228

SUMMARY OF QUALIFICATIONS

- Ph.D. in Materials Science and Chemical Engineering.
- Six years' experience in thin film creation, surface characterization, and data analysis.
- Proficient in formulation process and conducting mechanical, thermal test in industrial settings.
- A versatile and collaborative researcher who values open-mindedness, leadership, and effective problem-solving in process development.

EDUCATION

University of Massachusetts, Amherst, MA 2018/9 – 2024/12

PhD candidate, Chemistry, GPA 3.7/4

East China University of Sci. and Tech., Shanghai, China 2011/9-2018/7

M.S. and B.S., Chemical Engineering, GPA 3.6/4

SKILLS AND TECHNIQUES

- **Thin film Development:** surface modification (plasma, grafting, electrochemical), Chemical Vapor Deposition (CVD), spin coating, photolithography, etching, electroplating, sol-gel.
- **Process Engineering:** silicone foaming, coating formulations, microfluidics.
- **Surface Characterization:** four-point probe, UV-vis, FTIR, AFM, SEM, XPS, XRD, ellipsometry.
- **Material Characterization:** GPC, TGA, DSC, rheology test, mechanical test.
- **Computer Skills:** Python (Certificated in Plotting, Machine learning), OriginLab, Microsoft Office, Auto CAD, Illustrator.
- **Relevant Courses:** Analytical Chemistry, Pharmaceutical Science.

PROFESSIONAL EXPERIENCE

Graduate Research Assistant, Dept. of Chemistry, UMass Amherst 2018/9 – 2024/12

- Created nm-scale thin films for on-site leaf sensors using Chemical Vapor Deposition (CVD), realizing film consistency via chemical kinetics studies, and achieving real-time monitoring of tissue damage. Demonstrated distinguishable signals via electrochemical analysis and extended techniques to different plant leaves.
- Innovated electronic devices encapsulations using photo-initiated CVD techniques, optimizing antifouling properties and interface mass transport by leveraging polymer structure-property relationships, validated on enzymatic biosensors.
- Enhanced UV curing films on graphite felt by incorporating polymer matrix via colloidal chemistry, developed fiber-based sensor with improved electron transfer and a 6-fold increase in longevity.
- Collaborated with experts in protein ubiquitination and guide the fabrication of solid-state (optical) and textile-based (electrochemical) immunosensors.

Co-op, Tape Solution EV R&D team, Saint-Gobain Research NA 2024/2 – 2024/8

- Conducted experiments via DOE and determined the plant operating temperature for thermoset

polymers for EV batteries, performing thermal analysis (Thermal Protection System, TPS) and evaluating mechanical performance (Instron).

- Presented results through Python statistical analysis and visualization for cross-functional teams.
- Led material selection and rheology test for insulating coatings in product development.

Research Assistant, East China University of Science and Technology **2015/9 – 2018/7**

- Investigated process optimization for rifamycin S production by exploring alternative oxidants and identifying an efficient catalyst, addressing reactor corrosion and EHS concerns.
- Improved continuous production by studying reaction kinetics, reactor design and thermodynamics, realizing a yield increase from 60% to 80%.

TEACHING EXPERIENCE

Graduate Teaching Assistant, General Chemistry Lab **2018/9 – 2021/9**

- Supervised over 200 students conducting experiments. Increased student engagement by implementing report templates using Google Forms.

Graduate Mentor, College of Natural Science, UMass Amherst **2023/6 – 2023/8**

- Designed undergraduate independent research project on *Develop colloidal ink for textile-based enzymatic sensor*. Guided mentee on literature study and academic presentation.

PUBLICATIONS

(# Co-first author, * Corresponding author)

- **Fan, R.**; Li, Y.; Park, K.-W.; Du, J.; Chang, L. H.; Strieter, E. R.*; Andrew, T. L.*, A Strategy for Accessing Nanobody-Based Electrochemical Sensors for Analyte Detection in Complex Media. **ECS Sensors Plus** 2022.
- **Fan, R.**; Du, J.; Park, K.-W.; Chang, L. H.; Strieter, E. R.*; Andrew, T. L.*, Immobilization of Nanobodies with Vapor-Deposited Polymer Encapsulation for Robust Biosensors. **ACS Appl. Polym. Mater.** 2021, 3 (5), 2561-2567.
- **Fan, R.**; Andrew, T. L.*, Biosensor Encapsulation via Photoinitiated Chemical Vapor Deposition (piCVD). **J. Electrochem. Soc.** 2021, 168 (7), 077518.
- Kim Jae, J.#, **Fan, R.**#; Allison Linden, K.; Andrew, T. L.*, On-site identification of ozone damage in fruiting plants using vapor-deposited conducting polymer tattoos. **Sci. Adv.** 2020, 6 (36), eabc3296.
- **Fan, R.**; Andrew, T. L.*, Perspective—Challenges in Developing Wearable Electrochemical Sensors for Longitudinal Health Monitoring. **J. Electrochem. Soc** 2020, 167 (3), 037542.

PRESENTATIONS AND REWARDS

- The AVS 68th Symposium 2022, Thin Films for Soft Electronics, Oral Presentation
- UMassAmherst, ResearchFest 2022, Oral Presentation and Poster (William E. McEwen Award)
- ACS Fall 2021, Analytical Chemistry & Advances in Electrochemistry, Poster
- 239th ECS Meeting, International Meeting on Chemical Sensors, Poster (First Place Best Poster Award)