Xuan Li

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Education

Sun Yat-sen University (Guangzhou)- 985 Project universities **Sep.2019 - Jun.2022**

Member of the State Key Laboratory of Optoelectronic Materials and Technologies

Master of Engineering in *Materials Science and Engineering*, *average score*：*91.5/100*

- First Prize of Scholarship for Postgraduates in 2020

Beijing University of Chemical Technology (Beijing) - 211 Project universities **Sep.2015 - Jun.2019**

Bachelor of Engineering in *Polymer Materials and Engineering*, *GPA*：*3.05/4.33*

- Second Prize of People's Scholarship in 2018

Main Research Experience

Automated Transfer and Characterization of TMDs for Electrochemical Applications **Mar.2025 – Present**

- **Abstract:** Focused on the growth of TMDs, specifically MoS_2, and the development of an automated platform for transferring 2D materials onto target substrates. Optical microscopy and Raman spectroscopy were utilized to characterize the transferred materials and evaluate their quality and electrochemical performance.
- **Contribution:**

  1. Participated in the setup, calibration, and debugging of the automated transfer platform with Optical microscopy.
  2. Characterized transferred 2D materials using optical microscopy and Raman spectroscopy to assess transfer quality and material integrity.

Polymer Aging and Degradation Mechanism Analysis **July.2022 - May.2024**

- **Abstract:** Focused on the characterization and durability analysis of polymer materials in industrial environments. Acquired in-depth expertise in polymer aging mechanisms, including salt spray corrosion and photodegradation under saline and Sun exposure. Promoted technical knowledge by leading key projects and delivering seminars on material reliability testing.
- **Contribution:**

  1. Led key projects in the Aging Group, with responsibilities including experimental planning and technical supervision.
  2. Performed comprehensive material characterization using spectroscopy, thermal analysis, and mechanical testing to assess polymer performance and degradation.

Raman Spectroscopy and preparation of Te chain and S/Te doped chains **Jan.2021 - Jun.2022**

- **Abstract:** Investigated the doped chains induce structural and signal changes in tellurium chains and the relationship between specific carbon nanotube diameters. The characteristic peaks of tellurium chains also analyzed the optimal growth time for tellurium chains. This analysis can be used to predict the position of characteristic peaks for tellurium chains grown in carbon nanotubes of other diameters.
- **Contribution:**

  1. Proposed to improve the existing data by innovatively experimenting with the growth of sulfur-tellurium doped chains inside carbon nanotubes.
  2. Utilized Raman spectroscopy to identify changes in characteristic peaks after synthesizing and doping.

High Yield Synthesis of Sulfur chain inside carbon nanotubes **Feb.2021 - Jan.2022**

- **Abstract:** Investigated so far the most suitable carbon nanotube type diameter for sulfur chains, along with the optimal growth temperature and duration for their growth. Additionally, transmission electron microscopy was utilized to explore the configurations of sulfur chains grown within single-walled carbon nanotubes of different diameters.
- **Contribution:**

  1. Proposed experimental plans, discussed their feasibility with the advisor, and designed experimental conditions.
  2. Analyzed characterization data including Raman spectroscopy, transmission electron microscopy (TEM), and X-ray diffraction (XRD), and identified a new characteristic peak of the sulfur chain.
  3. Collaborated with Prof. Mingguang Yao's group at Jilin University to provide high-quality samples and investigate the properties of sulfur chains under high pressure.

Pressure-Tailored Synthesis of Confined Linear Carbon Chains **Sep.2019 - Feb.2021**

- **Abstract:** One-dimensional (1D) atomic carbon chains were synthesized within carbon nanotubes, by regulating the pressure and temperature during the growth of carbon chains, plotted the relationship between pressure, and reaction kinetics to investigate the optimal conditions for carbon chain growth.
- **Contribution:**

  1. Reviewed relevant literature and discussed experimental methods with the advisor, tackled the issue of oxygen entering the tubular furnace, which directly caused the carbon nanotubes to burn off at high temperatures.
  2. Determined the appropriate type of carbon nanotubes (CNTs) through experiments and tested the consistency of single-walled and double-walled CNTs in carbon chain growth under varying pressures and temperatures.
  3. Collected and analyzed the results, completed the writing, and revision of the paper, and successfully published it.

The preparation and curing properties about bisphenol S epoxy resin **Sep.2018 - Jun.2019**

- **Abstract:** Investigating different curing agents, synthesized bisphenol S epoxy resin with desirable properties.
- **Contribution:**

  1. Reviewed literature, set up the reaction apparatus and synthesis samples.
  2. Analyzed characterization results through DSC, GPC, TGA, FT-IR, and H-NMR.
  3. Completed the writing and revision of the graduation thesis.

Work Experience

City University of Hong Kong **Mar.2025 – Present**

Research Assistant

SGS-CSTC (Guangzhou) **July.2022 - May.2024**

Senior Technical Engineer & Leader for the Aging Group's Key Projects

Professional Skills

Experimental and Data Analysis Skills:

- Proficient in multi-wavelength Raman spectroscopy (514–785 nm) for material microstructure analysis, including phase transition and stress evaluation.
- Experienced in CVD and vacuum systems for nanomaterial synthesis, especially for battery-related applications.
- Skilled in polymer and carbon-based material synthesis and characterization using TEM, XRD, FT-IR, UV-Vis…
- Operated 100+ aging simulation instruments and conducted standard tests for polymer stability and performance.
- Familiar with colorimeter and gloss meter data analysis for surface degradation assessment.
- Able to estimate biodegradation rates via CO_2 emission analysis, familiar with sustainable materials research.
- **Language:** Proficient in communication in English: IELTS score of 6.5, Mandarin, and Cantonese.

Publications

- **Li, X.**; Zhang, Y.; Wu, Y.; Shi, L.* Pressure-Tailored Synthesis of Confined Linear Carbon Chains. J. Appl. Phys. 2021, 129, 064302.
- **Li, X.**[#]; Huang, J.[#]; Zhang, Y.; Shi, L.* 1D Nanoribbons of 2D Materials. Prog. Chem. 2023, 35, 88–104.
- Wu, B.[#]; **Li, X.**[#]; Yu, L.; Gao, Y.; Zhang, W.; Zhao, Y.; Liu, S.; Li, S.; Yue, L.; Jiang, Z.; Yin, Y.; Li, Z.; Hou, X.; Geng, Y.; Wang, D.; Yao, Z.; Zhao, H. J.; Cao, K.; Shi, L.; Yao, M. Ambient-Stable Ultra-Narrow Tellurene Nanoribbons Achieved via Pressure-Driven Nanoconfinement Reaction. J. Am. Chem. Soc. Submitted. (2025)
- Zhang, H.[#]; Chen, Y.[#]; Tang, K.#; Lin, Z.; **Li, X.**; Zhang, H.; Zhang, Y.; Wong, C. H.; Leung, C. W.; Mak, C. L.; Hu, Y.; Cui, W.; Cao, K.; Shi, L.* Microwave Heating as a Universal Method to Transform Confined Molecules into Armchair Graphene Nanoribbons. Nano Res. 2023, 16(7), 10644–10651.
- Wu, B.; Zhu, M.; Zhai, C.; Zhao, Y.; Meng, Y.; Dong, J.; **Li, X.**; Liu, R.; Shi, L.; Sundqvist, B.; Yao, M. Significant electron-phonon coupling in nanographene confined in single-walled carbon nanotubes due to the large amplitude of radial breathing-like vibrations. Phys. Rev. B 2024, 109, 195413.
- Wu, B.; Gao, Y.; Zhao, Y.; **Li, X.**; Tang, K.; Zhai, C.; Fan, X.; Shi, L.; Yao, M. Anharmonic Suppression of Ultra-Narrow Graphene Nanoribbons Confined in Carbon Nanotubes through Host–Guest Interactions. Appl. Phys. Lett. Submitted. (2025)
- **Patent:** A method for improving linear carbon chains. Patent number ： ZL 2022 1 0917268.6