

Zhuo Fan

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Research Interest: Photochemistry | Photoredox Catalysis | Nanomaterials | Chemical Biology | Polymer Chemistry | Supramolecular Chemistry | Photosensitizer | Biomedicine & Health

EDUCATION

Department of Chemistry, Beijing Normal University Sep.2022 - Present

- Master of Science in Chemistry (Expected Graduation: Jun. 2025), GPA: 3.69/4.0

Department of Chemistry and Chemical Engineering, Lanzhou University Sep. 2018 - Jul. 2022

- Bachelor of Science in Chemistry, GPA: 3.77/4.0

PUBLICATION (* denotes corresponding authorship)

1. **Zhuo Fan**, Kun-Xu Teng*, Yuan-Yuan Xu, Li-Ya Niu and Qing-Zheng Yang*. The Photodynamic Agent Designed by Involvement of Hydrogen Atom Transfer for Enhancing Photodynamic Therapy. *Angew. Chem. Int. Ed.* **2024**, e202413595. (Hot Paper)
2. Baoxin Zhang, **Zhuo Fan**, Chenxin Yu, Zhe Liu, Yongwen Shen, Xinping Hui, Jianguo Fang*. Labeling and Determination of Total Sulfhydryl Content in Protein. *University Chemistry*, **2022**, 37, 2111072.

RESEARCH EXPERIENCE

☞ M.S. in Chemistry Sep.2022 - Present

Department of Chemistry, Beijing Normal University

Advisor: Prof. Qing-Zheng Yang

A Design Strategy for Type-I Photosensitizers Involving Hydrogen Atom Transfer (HAT)

- A HAT-involved Type-I photosensitizer was synthesized which simultaneously generates superoxide and carbon-centered radicals under light irradiation
- The synthesized photosensitizer efficiently oxidizes NADH via deprotonation, exhibiting significant cell photocytotoxicity even under hypoxic conditions
- This work may inspire the development of novel Type-I photosensitizers employing the HAT mechanism. The manuscript has been accepted by *Angewandte Chemie*

Photoinduced Charge Transfer in Mechanically Interlocked Structures of Pillar[5]arenes

- Synthesis of rotaxane compounds using pillar[5]arene as the host and amino-terminated aliphatic chain BODIPY as the guest
- The mechanically interlocked structure was confirmed through crystal structure analysis, and the PET process will be investigated using fs-TAS

☞ B.S. in chemistry

Sep. 2019 - Jun. 2022

State Key Laboratory of Applied Organic Chemistry, Lanzhou University

Advisor: Prof. Jianguo Fang

Synthesis and Properties of Heavy-Atom-Free BODIPY Photosensitizers Based on a D-A Structure

- D-A molecules based on a BODIPY core were constructed to enhance the efficiency of ROS generation in photosensitizers by promoting photoinduced electron transfer (PET)
- D-A molecules were assembled into nanoparticles using the surfactant F127, and the photosensitizer was able to generate $O_2^{\cdot-}$ via PET
- This undergraduate thesis gave me a basic understanding of the photophysical and photochemical processes of organic molecules and was selected as an **Outstanding Undergraduate Thesis**

Labeling and Determination of Total Sulfhydryl Content in Protein

- This experiment utilizes the reaction between the Naph-EA-Mal probe and thiol groups to label bovine serum albumin (BSA) and achieve fluorescence imaging of living cells
- The Naph-EA-Mal fluorescent probe enables in situ detection and fluorescent labeling of intracellular thiol groups, and this experimental method has been published in *University Chemistry*

TECHNICAL SKILLS

- **Chemistry:** Organic Synthesis; Photophysical Properties Characterization and Analysis; SEM and DLS characterization of nanoparticles; Cyclic voltammetry measurement; ESR analysis of radical species; Growth and characterization of organic molecule crystals; Synthesis of linear polymers
- **Biology:** Cell culture; Live cell imaging; Determining Cell Vitality; Detection of ROS oxidative stress in cells; Analysis of cell death pathway

TEACHING AND MENTORING

Teaching Assistant

- Photochemistry, graduate Course (CHE21213801), *Beijing Normal University* Oct. 2023 - Nov. 2023
- The Charm of Organic Chemistry, Undergraduate Course (GE410086401-01), *Beijing Normal University* Feb. 2022 - Jun. 2022

Research Mentor

Guided five undergraduate students in the Yang Lab, assisting with research training and supervising thesis projects.

HONORS AND AWARDS

- Grand Prize in National Chemistry Experiment Innovation and Design Competition | Lanzhou University (university-wide, among > 100 anticipants) Aug. 2021
- Outstanding Undergraduate Thesis | Lanzhou University Jun. 2022
- First-Class Scholarship for New Graduate Students | Beijing Normal University Jan. 2023
- The First-Class Academic Scholarship | Beijing Normal University Nov. 2024

EXTRACURRICULAR ACTIVITIES

Joined the 2nd Photochemistry Summer School of the Chinese Society for Imaging Science and Technology (CSIST), Beijing, China July. 2023