Curriculum Vitae

Bingru Wang

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EDUCATION BACKGROUND

Zhejiang University   **09/2020-07/2024**
Bachelor of Engineering in Agricultural Engineering   GPA for the third academic year: 90.9/100.0
                                                                                                     Overall GPA: 85.1/100.0

Scholarship & Award:
Zhejiang University Kangerda Second Class Scholarship;   Zhejiang University's Student Progress Model

RESEARCH EXPERIENCE

Flexible Small-Scale Low-Dimensional Optoelectronic Device Based on Gold Nanoparticle Electrodes
05/2023-Present
The Optoelectronics Group @ ZJU; *Supervisor*: Prof. Zongyin Yang

- By combining metal nanoparticles with a polymer composite matrix, the physical structure of metal nanoparticles in the composite system is controlled, achieving tunable fabrication of gold nanoparticle electrodes.
- Innovatively, the gold nanoparticle electrodes these are then combined with one-dimensional material GdS nanowires possessing excellent optoelectronic properties to create flexible, small-sized, low-dimensional optoelectronic materials devices.
- Undertook the task of all the experimental operations, including the preparation of Mark through a series of steps such as gluing, exposure and development; The photoresponsive GdS nanowires are transferred to the Mark on the substrate using treated optical fibers and through steps such as bonding with the gold nanoparticle electrode.

(A SCI paper for which I am the second author is expected to be submitted in November this year)

Preparation of Low-Voltage Luminescent Flexible and Stretchable Devices Using SiO_2 Nanoparticle-Modified Tris (2, 2'-bipyridine) Ruthenium (II)
10/2022-present
The Laboratory of Flexible Sensors and Intelligent Equipment at Zhejiang University; *Supervisor*: Prof. Geng Yang

- Tris(bipyridyl)ruthenium (II) chloride with electrochemiluminescence characteristics was combined with ionic solutions for low-voltage luminescence. The luminescence stability and lifetime of the devices were enhanced by SiO_2 particle modification based on low-voltage luminescence.
- Prepared SiO_2 particle-modified tris(bipyridyl)ruthenium (II) chloride and applied it in the preparation of low-voltage luminescent flexible and stretchable devices.
- Combined with temperature and humidity sensors, to form a sensing-display system that was applied to crop state monitoring and real-time display.

Design and Fabrication of a Surface Morphology Recognition Sensor Based on the Principle of Electroluminescence
01/2023-06/2023
The Laboratory of Flexible Sensors and Intelligent Equipment at Zhejiang University; *Supervisor*: Prof. Geng Yang

- Proposed the concept of making a surface morphology recognition sensor through ionic gel microstructure based on the double electron layer and analyzed the feasibility and difficulty of preparation to finalize the specific scheme of the study.
- By using different materials, designing various processes, and continuously adjusting the material ratios, produced the best surface morphology recognition sensor based on the electroluminescence principle and verified its recognition effect.
- Linked the surface morphology recognition sensor and the software, combined openCV and Raspberry Pi, programmed in Linux environment for robotic-based Braille touch recognition detection. This project could bring tremendous assistance to visually impaired individuals, especially those who face challenges with Braille.

(A SCI paper by myself is expected to be submitted in October this year)

Design and Fabrication of Stretchable AC Electroluminescent Devices based on Ionic Materials
02/2023-05/2023
The Laboratory of Flexible Sensors and Intelligent Equipment at Zhejiang University; *Supervisor*: Prof. Geng Yang
- In order to solve the problem of complex and time-consuming preparation process of current AC electroluminescent devices and ensure good tensile and conductive properties, a new AC electroluminescent device based on ionic materials with excellent tensile properties and high transparency was proposed.
- Developed a stretchable AC electroluminescent device based on ionic materials with silver nanowires (AgNWs) coated by drop-casting that exhibit excellent stretchability and conductivity of the flexible electrodes through the coupling effect of ions and electrons.
- After material characterization, it is demonstrated that the newly prepared flexible electrode has a resistance of kilo-ohms in the unstretched state, and the resistance increases almost linearly with the strain, which has the potential to be used as a tensile strain sensor. Additionally, the designed and prepared ion-based stretchable AC electroluminescent device can emit stable and uniform light even when subjected to a strain rate of 300%.

Calculation and Experimental Research on Hydrodynamics in Circular Aquaculture Tanks
07/2022-01/2023
Institute of Agricultural Bioenvironmental Engineering; *Supervisor: Prof. Zhangyin Ye*
- Vortex strength and secondary flow strength are important parameters reflecting the water homogeneity and self-cleaning ability of aquaculture ponds, but these aspects are not calculated and analyzed in many previous studies on recirculating aquaculture systems based on CFD.
- Modeled in COMSOL, adjusted parameters, and performed fluid simulation calculations by customized meshing; analyzed the fluid simulation results .
- The hydrodynamic characteristics of the circular fish pond with different diameter-to-depth ratio and jet Angle were analyzed comprehensively from the aspects of vortex strength and secondary flow strength, and the design of the circular fish pond with better water uniformity and self-cleaning ability was obtained.

ACADEMIC COMPETITION
ASABE Robotics Student Design Competition;
03/2022-07/2022
Topic: To build a robot, or group of cooperative robots, which accomplish a simulated pre-, peri-, or post-harvest agricultural operation.
- Was mainly responsible for program coding, implementing autonomous navigation of the car and fully automatic cotton picking.
Award: Best Distance-based Entry-Best Video

TEACHING ASSISTANT
TA of Table Tennis Class; *Supervisor: Zhiqiang Chen & Xiaoling Huang*
- Assisted the teacher in correcting the students' table tennis playing movements and practiced with them to improve their skills quickly.

OTHER INFORMATION
- Professional Skills: C#, Python, Arduino, AutoCAD, Solidworks, Matlab, AD19, COMSOL Multiphysics
- Speciality: Violin, Table Tennis
- Extracurricular activities: Table tennis class "Wish You Full Performance" Volunteer Activity 05/2021-05/2022
  2020-2021Table Tennis "Sanhao Cup" Competition   10/2020