Chuting Cai

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EDUCATION

Tsinghua University, Beijing, China

Aug 2017- Present

B.E. in School of Materials Science and Engineering (SMSE)

GPA (courses completed from 1st year): 3.70/4.0; **Rank:** 13/108;

Core Courses: Physical Chemistry (A), Fundamentals of Materials Science (A), Organic Chemistry (A-), Engineering Mechanics (A), X-Ray Diffraction Analysis (A-), Technological Foundation of Laser Processing (A-), Fundamental for processing techniques of low-dimensional materials (A-)

RESEARCH EXPERIENCE

Department of Precision Instrument, Tsinghua University

May 2020- Now

Advisor: ***Prof. Huanglong Li***

Van der Waals contacts between three-dimensional metals and single-layered MoS_2

- Optimized the geometry of contact models of single-layered MoS_2 and bulk metals with work function about 4.2 eV.
- Studied the bonding circumstances of the contact areas by analyzing the formation energy of metal sulfides.
- Discovered contact barriers by calculating density of state of the systems.
- Studied on the relationship between contact barrier and the ability to form a Van der Waals contact.

Lab of Low Dimensional Nanomaterials, School of Materials Science and Engineering, Tsinghua University

Oct 2018- Nov 2020

Advisor: ***Prof. Kai Liu***

Electron mobility of crested single-layered MoS_2

- Created a rough morphology on SiO_2/Si assisted by the self-assembly of copolymer.
- Introduced strain on a single-layered MoS_2 by transferring the MoS_2 layer on the rough substrate.

- Created an electrical device by transferring two Au electrodes on the top surface of MoS_2.
- Studied on the variation of electron mobility in our device compared with MoS_2 on smooth substrate by measuring I_d-V_g curve.

Lab of Low Dimensional Nanomaterials, School of Materials Science and Engineering, Tsinghua University

July 2018- Sept 2018

Advisor: ***Prof. Jinquan Wei***

Synthesis of carbon nanotube (CNT) superhydrophobic thin film and its application in submarine fluid dynamics

- Dispersed CNT in ethanol through sonication as the precursor for synthesis.
- Synthesized CNT superhydrophobic film by filtering the CNT-ethanol system through hydrophilic CNT film to form micro- and nanostructure.
- Interpreted the application of the film on a submarine by gluing the film on a cone model.
- Studied on the reduction of water resistance when moving the model under water.

AWARDS

- **Scholarship for Academic Excellence** sponsored by Toyota Company 2019
- **Scholarship for Art Excellence** (set by Tsinghua University) 2019
- **Second-class scholarship for freshmen** 2017

LANGUAGE AND SKILLS

- Analytical Instruments in Proficiency

  X-ray diffraction (XRD), scanning electron microscopy (SEM), optical microscope, atomic force microscopy (AFM), Raman microscope, probe station, semiconductor parameter analyzer
- Software

  CASTEP, LAMMPS, programming in C++, programming in python, Origin, MATLAB.
- English Proficiency

  GRE: Verbal 150/170, Quantitative 170/170, Analytical Writing 4.0/6.0