

Statement of Purpose

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Background

I always said I was NO.1 of two students in my major, whenever I was asked about my ranking in Composite Materials and Engineering (CME). That was because Honors School only accepts two students studying CME from tens of students in this major in Harbin Institute of Technology (HIT) every year. Honors School is a special school of HIT, which only selects about 200 fresh students from 40 majors of 4000 students each year. And I feel honorable to join the Honors School and could begin to do researches with great support.

After taking the College Entrance Examination, I chose Composite Materials and Engineering as my major in Harbin Institute of Technology (HIT), because it required students studied more courses of two majors, Materials Science and Engineering Mechanics. Thus I could study all the basic theory of materials and better know how to design materials using mechanical theory at the same time.

According to HIT's education principle, all the fresh members should be in a separate campus for basic study and transition from high school to university. Because no research centers exist on this campus, I spent much time deeply studying the basic courses and used my spare time to learn team cooperation. Thus I usually helped my counselor to organize student activities. For example, I ever organized a two weeks' summer camp between Lansing College and HIT with over 100 students. When I returned to the main campus after one year, immediately I decided to work in Center for Composite Materials and Structure (CCMS), which is a Key Laboratory for National Defense Science and Technology, China.

Research experience

During my first semester in CCMS, I studied on the inflatable structures and deployment simulation, and successfully applied for Undergraduate Innovative Project of Science and Technology with financial support. Through widely reading papers about inflatable technology and deployment simulation, I got an idea about inflatable garbage capsule in space and successfully published a paper in the Academic Forum for Undergraduates, named Study on Inflatable Garbage Capsule in Space.

After study on the inflatable structure, I felt it was less related to advanced materials preparation and application. So I changed to do researches on zirconium oxide coatings by sol-gel process. I used zirconium oxychloride ($ZrO(NO_3)_2 \cdot 2H_2O$) and zirconium dinitrate oxide ($ZrOCl_2 \cdot 8H_2O$) to prepare ZrO gel, and made coatings by czochralski method. At the same time, I also studied the drying methods by varying the temperature and sustaining time, and find a better way to make coatings without cracks. During this time, I also helped a graduate student prepare thermal-protection materials reinforced by

fiber.

When I became a junior, I did some researches on thin films. In the first semester, I try to make yttrium oxide (Y_2O_3) films by reactive magnetron sputtering on silicon substrate. I studied the composition, the mechanical property, and the effect of deposition parameter. At last I published a paper in Thin Solid Films, titled "Growth and characterization of yttrium oxide films by reactive magnetron sputtering".

In the second semester as a junior, I did researches on composites and prepared diamond-aluminum (C-Al) composite materials. Due to C-Al materials could achieve better conductivity and decrease the prize/weight, I tried to make C-Al materials by hot-pressing sintering and studied its characterization using X-ray diffraction (XRD), Scanning electron microscope (SEM), and Raman spectroscopy. Through several months' hard working, I successfully applied for a patent titled "New mixing method of diamond-aluminum composite materials preparation", and prepared to publish a paper titled "Preparation and characterization of diamond-aluminum composite materials by power metallurgy".

I also spent time taking some important national competitions for undergraduate students, such as Mathematical Contest in Modeling (MCM), USA, Undergraduate Mathematical Contest, China, Chinese Undergraduate Mathematical Contest in Modeling, and Heilongjiang Mechanics of Materials Experimental Contest. Through these competitions, I not only worked well with my team but also got some excellent awards. In addition, I worked as teacher assistant in Honors School and became a tutor after classes for high school students. Even I cooperated to write a book named "Structural Reliability of Composite Materials" for follow students in my major. Therefore I believe that I have got enough experience to assist the professors and academic team.

Objective

I have long admiration for the graduate program. If I achieve the opportunity to do further study at your esteemed school, I would like to work on thin films, energy materials, or nano-materials, which are much related to my past experience and have importance in future life. My career objective is to become a researcher or professor in materials science. I believe with the guidance of the talented and devoted faculties in the Department of Materials Science and Engineering at your esteemed university, my dream will come true.