

# Exploration and Practice of Master's Degree Training in Materials and Chemical Engineering Under the Background of Industry-education Integration

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**Abstract:** Under the background of rapid social development in the new era, the international environment is complex and changeable, and the world is experiencing major changes unprecedented in a century, which puts forward higher requirements for the training quality of professional master's students. Under the background of integration of industry and education, this paper analyzes the problems revealed in the current training process of master's students in materials and chemical engineering, and explores the improvement of the training mode of master's students in materials and chemical engineering and the optimization of the quality supervision system of postgraduate education, so as to improve the training quality of professional master's students.

**Keywords:** Professional master's students, Integration of industry and education, Cultivation mode, Postgraduate education quality supervision system.

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## 1. Introduction

In the context of the development of global professional degree graduate education, in order to meet the requirements of China's social and economic development for talents at that time, China began to implement the professional degree education system since 1991, and professional master's education began to develop rapidly since then, China's postgraduate training system divides master's training into two categories: academic master's students and professional master's students, academic master's students are more focused on theoretical and academic research than professional master's students. Compared with academic master's students, professional master's students focus on applying solid theoretical knowledge to practical work needs, and combine theoretical knowledge with specific practice. Professional degrees and academic degrees complement each other and together form the two major components of modern higher education degrees in China.

Today in the 21st century, the world has ushered in a period of great development, transformation, and adjustment. The Academic Degrees Committee of the State Council and the Ministry of Education issued the Development Plan for professional degree Graduate Education (2020-2025), which mentioned that professional degree graduate education is the main channel for cultivating high-level applied professionals. And in 2025, the enrollment scale of master's professional degree graduates will expand to about two-thirds of the total enrollment scale of master's graduates. Therefore, it is particularly important to cultivate high-level applied talents that the country, society, and enterprises need.

## 2. The Training Status of Master's Students in Materials and Chemical Engineering

In the 90s of the 20th century, the establishment of professional degrees began, and there were some problems in their rapid development and practice. In the process of

training, professional master's students are related to and different from academic master's students, and professional master's students are characterized by the integration of industry and education. Since the founding of New China, China's engineering education has developed rapidly, forming the world's largest engineering education, Harbin Institute of Technology is a typical engineering college, Harbin Institute of Technology Weihai Campus School of Materials Science and Engineering from 2011 to the first batch of professional master's students in materials engineering to 2021 recruitment of professional master's students are two years, students in school time is tight, during the school period emphasis on theoretical learning, the practical process is not perfect and the assessment procedures are not strict, The choice of topics is divorced from practice and deviates from the goal of professional degree training, and the homogeneous training of professional degrees and academic degrees is particularly obvious in postgraduate training, and the integration of industry and education does not highlight its advantages in the training process. For engineering students, in order to master the latest knowledge and the latest technology, students must need the integration of industry and education, and the close cooperation between schools and enterprises, so that the talents cultivated are more suitable for the workplace. The school has the advantages of school training, but the training of professional master's students in the industry cannot be replaced. In 2022, the reform of the academic system of postgraduate training in our school will be changed from two years to three years, how to implement the practical links required by the integration of industry and education in the whole process of student training, how to optimize the evaluation and supervision mechanism of the quality of professional master's training, and indeed improve the academic level of students, which has become an urgent problem to be explored and solved in the improvement of the professional master's training model.

### **3. Improve the Training Mode of Master's Degree Students in Materials and Chemical Engineering**

The training of professional master's students in engineering is oriented to become "professional skills" engineers. Different from the training of academic master's students, the training of professional master's students should highlight the characteristics of training, focus on increasing the proportion of practical training, and highlight practical teaching. Therefore, the training of master's students in materials and chemical engineering has a more special positioning in terms of talent training goals, basic requirements and curriculum system settings.

After the reform of the professional master's degree system of our university, the material and chemical engineering discipline of the School of Materials Science and Engineering faces the world's scientific and technological frontier, the main economic battlefield, the major national needs, and the people's life and health, and cultivates application-oriented high-level engineering technology and engineering management talents who have solid basic theory and systematic expertise in the field of materials and chemical industry, and have engineering practical experience and certain organizational management ability and innovation ability. Secondly, in addition to the basic quality, basic knowledge and structure, and basic bachelor's ability, the basic requirements for master's degree students in materials and chemical engineering are also clearly required to participate in professional practical learning and other innovation and entrepreneurship practice activities at the university-level and college-level graduate school-enterprise joint training base during their studies. Finally, in the curriculum system, in addition to the compulsory courses of degree courses and elective courses, the requirements for the professional practice of professional master's students during their studies are clearly defined. and further explain the requirements for professional practice. Specifically, starting from the above three aspects, it shows the difference between master's students and academic master's students in materials and chemical engineering, and reflects the characteristics of professional degree graduate education.

### **4. Optimize the Quality Supervision System for Master's Degree Education in Materials and Chemical Engineering**

China's professional degrees have been developed for more than 30 years, and a set of professional master's education quality supervision and guarantee system with Chinese characteristics has been gradually established and explored, but there is still a problem of incompatibility between system requirements and practice process in the construction process. In recent years, a series of documents such as the "Opinions on Strengthening the Construction of Quality Assurance and Supervision System for Degree and Postgraduate Education" and "Notice on Further Standardizing and Strengthening the Management of Postgraduate Education" have fully demonstrated the firm determination of the state and education administrative departments to build a solid quality assurance system for postgraduate education. Therefore, it is very important to learn from foreign experience and combine the characteristics of its own discipline to improve the

training quality supervision and guarantee system of professional master's degree in materials and chemical engineering.

The quality of professional graduate education in the United States is not only measured by the school or education system, but also by social reputation, and some majors also use industry employment standards as an evaluation dimension. Germany's postgraduate training quality evaluation system is certified under the professional standards jointly designated by the social industry and the training unit, and the standard content is comprehensive. The training of professional master's students in the UK takes students' professional knowledge and ability as an important indicator. The evaluation of the quality of graduate training in Japan is a model that combines self-evaluation and external evaluation. Analyze the advantages and shortcomings of the education quality supervision system of professional master's students in many countries, integrate the concept of integration of industry and education into it based on the existing actual situation, organically combine the feedback of the market, government and universities, and build a scientific and reasonable evaluation and supervision system. Under the macro guidance of the government, increase the autonomy of colleges and universities in the training and management of professional master's students, and also increase the autonomy of the industry in the integration of research, production and education. Students practice at companies, apply their professional knowledge in practice, and participate in the development of student research projects with teachers on campus. In the stage of practical process management, students are required to report internship practice, thesis progress and ideas to the on-campus supervisor and enterprise supervisor. In the whole process of student training, the on-campus tutor and the enterprise tutor jointly evaluate the progress and completion of the student's project work, jointly evaluate the internship practice results, participate in the graduation design of the students, and finally evaluate the comprehensive ability of the students as a whole. In this way, they give full play to their respective advantages, further improve the quality supervision system of postgraduate education in materials and chemical engineering, and further promote the deep integration of production, education and research.

### **5. Conclusion**

Actively implement the Party Central Committee and the State Council's reform and deployment on deepening the integration of industry and education, further improve the talent training and supervision system, promote the deep integration of industry, education and research, accelerate the cultivation of high-level talents urgently needed by the country, and contribute to the historical vision of building a modern socialist country in an all-round way and realizing the Chinese dream of the great rejuvenation of the Chinese nation.

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