Overview

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▣ Overview

Historically, the quality of mankind's life has improved with the development of new materials. The material industry includes conventional metals and ceramics, semiconductors, ferroelectrics, optical and magnetic materials for information technology and electronics, composites, and batteries and sensors for energy and environment industry. The research about materials has played a role in making significant progress in the advanced industry. Recently, development of materials is in great demand due to the advances in the electronics · telecommunications, nanotechnology, and biotechnology. The materials science · engineering dealt with aggregated materials such as solid in the past, and is now expanded to flexible materials, soft/biological materials, and liquid materials.

The very core of Materials Science is to understand the relationship between microstructure properties and working principles. It is designed to understand and predict the working mechanism of materials based on physical and chemical principles by controlling atomic combination for the formation of compound, phase, microstructure and nanostructure.

Materials Engineering then deals with the synthesis of desired forms of materials having particular properties based on materials science. In other words, it applies the understanding about materials science to the development of processing and materials. As such, the research about materials science · engineering contributes to improving the quality of life by realizing the innovative characteristics, multi-functional properties, and high performance of materials. In upcoming ages, the development of innovative materials is expected to become more and more important.

Materials science and engineering is a scholastic field of continuous growth and expansion and is one of exciting and challenging fields of engineering. In response to this, materials science and engineering aims to provide the specialized, international, and multidisciplinary research and education.

▣ Academic and Research Activities

Department of Materials Science and Engineering has already been evaluated by ABET, the American engineering education evaluation institution, as "on par with the top 5 US institutions based on the scholarly research activities and the records on graduates" since 1993. This suggests that the level of academics and research activities in the Department of Materials Science and Engineering is approaching the internationally first class level. Actually, based on the recent research records on the SCI journal, the average number of papers (the department: 8.78, top 5 US institution: 8.7-14.9) and impact factor per paper (the department: 6.47, top 5 US institution: 5.4-10.4) are comparable or approaching to the level of top 5 US institution.

Moreover, based on the QS World University Ranking conducted by British global university evaluation institution, the department of materials science and engineering was ranked the 16th in the world in 2014, 19th in the world in 2015, 18th in the world in 2016, 13th in the world in 2017 and 13th in the world in 2018, which demonstrates that the research capability at KAIST is the world top-class. KAIST Department of Materials Science and Engineering is constantly racing toward the world top-class Materials Science and Engineering.

Materials Science and Engineering has been recently expanded to NT, BT, ET including conventional metal, ceramic material and IT, and many laboratories in the Department of Materials Science and Engineering are conducting world-class research. In accordance with the research trend, the department broadens investment in the research and education of nanomaterial/biomaterial/energy material. To fulfill such research, the department is equipped with following equipment.

The core equipment includes transmission electron microscopy, scanning electron microscopy, Auger spectroscopy, XPS, X-ray diffractometer, Instron tester and the department joint eqipment includes AFM, SPM, Nanoindentor, thermal analysis equipment, thin film deposition device, powder processing device, optical microscope, device for metal specimen, bulk and thin film mechanical tester, heat treatment device, and arious analytical devices. Besides, each laboratory has professional research facilities, which can be used interchangeably.

The department has won various research center programs such as 'Wearable Platform Materials Technology Center'(ERC) chosen as excellent research center by national research foundation of Korea in 2016 and 'multi-dimensional nanomaterial assembly control' and 'activation of biocatalyst and amyloid aggregation control photosensitization system' in 2015. Moreover, the department has been selected as BK21 PLUS, the third step for development project of highly skilled human resource since 2013 and subsidized for 21 years including the first step. Through the BK21 PLUS support, the department is prospering to be the world-class materials science and engineering through the improved quality of research, students' participation in international conferences and employment of young researchers.

The department also has active international collaboration, managing the 'Global Alliance Program' with MIT (widely considered as the excellent institution) in the United States, UIUC, Northwestern Univ., Argonne National Laboratory, Imperial College London in Great Britain, Nanyang Technology University in Singapore, Tohoku University in Japan. Moreover, the department strives to become the leading group in the field of materials through joint workshop with MIT, international workshop with invitation of ACS editors, joint symposium with six institutions (KAIST, POSTECH, NTU, NTHU, USTB, Tohoku University) in five countries.