Division of Electrical Engineering and Computer Science	Research field	Advanced Materials and Device Processing	Lab. ID EC34
Laboratory web site	http://materia2.w3.kanazawa-u.ac.jp/advanced%20material%20and%20device%		

Research subjects

Because an electric polarization caused by electric field applying remains as a residual polarization after the electric field removal, the ferroelectric substance is applied to memory, an actuator, a sensor. In our laboratory, I manufacture a ferroelectric film and the laminated structure with various semiconductors, electrodes using the film manufacture method such as the pulse laser sedimentation method or the chemical solution sedimentation method and aim at the development of the new electronic device which I applied the remaining polarization that a ferroelectric substance has to. A new electronic device to intend for is a diamond field effect transistor (FET), two-dimensional stratified formation compound FET, oxide semiconductor FET.

Master/Doctor course: Education policy, curriculum, typical activity in the laboratory

The graduate student who belonged to a laboratory sets the study theme of the great binding after consultation with a teacher and starts the study in the group from next April for master's course one year. A study theme of each person will be narrowed down in the process. In the laboratory, make arrangements with an instructor every study group and, through a result study meeting in the whole laboratory, plan the effective promotion of the study. In addition, I learn the scientific society-like positioning of own study by introducing domestic and foreign results of research by the laboratory seminar (seminar, practice) mainly on the article introduction, and arguing and plan the scientific technique-like deepening of the study more. The study posture that is more active than M student including the drafting enforcement of the study plan and the announcement in the international conference is expected to a doctoral course student. Through such research activities, I encourage it to announce the result in an internal and external society and article.

Daily life in the laboratory, etc.

As for the everyday life of the graduate student of the laboratory assignment, a laboratory on the natural science Building No. 2 the fourth floor plays a key role. On the occasion of an experiment, not only the laboratory on the Building No. 2 the fourth floor but also the laboratory in the tip science materials laboratory ridge (popular name VBL ridge) 1.2 floor of 1 Chikashi Tachi is available in the same way. I come to be able to operate it by each person while there being various film manufacture devices and properties of matter evaluation equipment in the laboratory, and receiving instruction from a graduate student registered at a laboratory and a teacher. It is necessary to learn the theory of various devices definitely to perform the sample manufacture with the plasticity and right properties of matter, device evaluation.

Message or comments by the laboratory faculty staffs

The most are not only electronic parts maker and electronics manufacturers, and the graduate student of the laboratory gets the technology development post at each local electric power company. The person who can act as the team is demanded while challenging the new field daringly in these companies, and pushing forward duties with independence of will. The education research activities in the laboratory become the training of that purpose.

Recent Master theses in these 3 years (+ more if appropriate)

year.month	Thesis title (including English translation of Japanese thesis title)
2021.3	Fabrication of diamond FET with ferroelectric gate for power device applications
2019.3	Study of process technology of advanced oxide TFT devices
2019.3	Preparation of ferroelectric gate diamond FET for power devices with low power consumpption
2018.3	Fabrication of B-doped diamond FET with ferroelectric gate structure
2017.3	Fabrication of field effect transistor using Ga2O3
2017.3	Study of diamond field effect transistor with ferroelectric gate structure
2017.3	Study of low cost process technology for diamond power devices applications
2017.3	Fabrication of 1Tr type ferroelectric memory devices using 2D material
2016.3	Development of diamond FET using organic ferroelectric gate
2016.3	Development of MoS2-FET with VDF/TrFE copolymer
2016.3	Fabrication of ferroelectric-gate β-Ga2O3 FET structure
2016.3	Investigation on characteristics of superconductivity in diamond using ferroelectric gate structure
2015.3	Development of diamond FET structure using ferroelectric gate
2015.3	Retention properties of BiFeO3 film capacitor for high-temperature operation
2015.3	Development of Field Effect Transistor using two-dimensional material for channel
2015.3	Development of new microfabrication technique for ceramics by using deliquescence material

2015.3	Development of engineered multiferroic materials using ferroelectric/magnetostrictive bilayered structure
2013.3	Fabrication of BiFeO3/diamond layered structure for high-temperature operation of FeRAM
2013.3	Fabrication and Characterization of MFIS Capacitor Structure with Ferroelectric (Bi,Pr)(Fe,Mn)O3 Thin Films
2013.3	Fabrication of BFO ultra thin film capacitors for low voltage operation FeRAM
2013.3	The development of novel fabrication techniques for oxide electronic device using functional materials
Recent Doctoral theses in these 3 years (+ more if appropriate)	
year.month	Thesis title (including English translation of Japanese thesis title)
2014.3	Fabrication and characterization of non-lead ferroelectric BFO films and their application to nonvolatile memory
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