

Plasma Science and Technology

2 units (selection)

Kaoru Ohya · PROFESSOR / MATERIAL AND DEVICE SCIENCE, ELECTRICAL AND ELECTRONIC ENGINEERING, SYSTEMS INNOVATION ENGINEERING

Target) The lecture aims to understand electronic, atomic and molecular collision processes in gases and solids and to present their various applications.

Outline) 1) Electronic, atomic and molecular collisions in gases and solid. Plasma physics and chemistry. Surface and materials science related to plasma-solid interactions. 2) Application to material processing technologies for electronic devices. Plasma-wall interactions in controlled thermonuclear fusion devices.

Style) Lecture in combination with Portfolio

Keyword) *plasma, collision theory, plasma-surface interaction, plasma applications*

Goal)

1. Understanding on collision processes in gases and solids
2. Understanding on applications to material processing technologies and plasma-wall interactions in controlled thermonuclear fusion devices.

Schedule)

1. Introduction to collision theory
2. Interaction potential
3. Elastic collision and nuclear stopping power
4. Inelastic collision and electronic stopping power
5. Inelastic processes in gases
6. Electron and Ion transport in gases
7. Reflection and thermal re-emission from solids
8. Collision mixing and diffusions in solids
9. Physical sputtering and chemical sputtering
10. Plasma chemical vapor deposition deposition
11. Plasma-assisted etching
12. Other applications to material device processing
13. Plasma-wall interactions in nuclear fusion devices
14. Edge plasma physics
15. Hydrogen recycling and material erosion
16. Conclusions and future problems

Contents) <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216871>

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