

## Materials Surface Performance Control

2 units (selection)

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**Target)** The nano processing of the material surface in the atomic and molecular level is carried out by the surface modification methods such as PVD or CVD. The material surface nano processing to manifest the new performance in the material surface and its evaluation is explain in this lecture. The development of the new functional materials and the precept to its application are given.

**Outline)** In this lecture, the surface micro processing which manifests new performance on the surface of material by processed under the atom or molecule level is explained, and its evaluation also is mentioned. How to be invested the transparency, electrical and electronic properties, photocatalytic materials and gas barrier by PVD or CVD methods is explained. Then, the effects of surface modification on the mechanical properties such as fatigue, friction-wear and corrosion of materials are discussed and then its evaluation is mentioned.

**Style)** Lecture

**Keyword)** *surface modification, PVD, CVD, functional thin film, surface engineering*

**Relational Lecture)** “Advanced Micro-Nano Engineering”(0.5), “Controlling Physical Properties of Crystalline Materials”(0.5), “Micro-Nano Engineering”(0.5)

**Requirement)** 特になし

**Goal)**

1. Understanding of functional materials development
2. Understanding of evaluation of material surface performance
3. Understanding of nano processing
4. Understanding of mechanical properties of functional materials

**Schedule)**

1. Function of material surface
2. Nano processing of material surface
3. Nano processing of material surface
4. Nano processing of material surface
5. Material surface modification by PVD and CVD
6. Material surface modification by PVD and CVD
7. Group discussion

8. Evaluation methods of material surface performance

9. Evaluation methods of material surface performance

10. Transparency

11. Electromagnetic wave shielding properties

12. Electric properties

13. Improvement of corrosive resistance

14. Improvement of friction and wear properties

15. Improvement of fatigue properties

16. Group discussion

**Evaluation Criteria)** Over 60% of group discussion, reports and Examination

**Textbook)** Prints

**Contents)** <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216856>

**Contact)**

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