Precision Machinery

2 units (selection)

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Target〉 To understand the principles, applicability, and recent trend of two measurement techniques based on X-ray and THz wave for precise machinery.

Outline〉 In the first half of this lecture, we learn about residual stress measurement method by using X-ray diffraction. Large residual stresses in materials may sometime cause destruction or transformation. Therefore, a measurement of residual stress is important. THz wave, located at a boundary between optical and electric waves, has attracted attention as a new tool for precise machinery. In the later half, students learn THz instrumentation and metrology.

Keyword〉 ***X ray diffraction, X-ray stress measurement, THz spectroscopy, THz imaging***

Fundamental Lecture〉 "**Measurement Science and Technology**"(1.0), "**Material Engineering**"(1.0)

Relational Lecture〉 "**Physical properties of materials**"(0.5), "**Material Engineering**"(0.5)

Requirement〉 To master Mechanical Measurement and Scientific Measurement in bachelor course

Goal〉

1. Understanding of X-ray stress measurement
2. Understanding of THz instrumentation and metrology

Schedule〉

1. X-ray diffraction (1) Characteristics of X-rays
2. X-ray diffraction (2) Crystal structures
3. X-ray diffraction (3) Diffraction by an atom and a small crystal
4. X-ray diffraction (4) Powder diffraction
5. X-ray stress measurement in poly-crystal material
6. X-ray stress measurement in textured material
7. Presentation of measurement example
8. Report and presentation
9. Introduction to THz technology
10. Generation of THz wave
11. Detection of THz wave
12. THz spectroscopy
13. THz imaging
14. THz applications
15. Report and presentation
16. Examination

Evaluation Criteria〉 Report & presentation 60%, examination 40%

Textbook〉 Printed synopses are used.

Reference〉 None

Webpage〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197328

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216739

Student〉 Able to be taken by only specified class(es)

Contact〉

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