

Material Applications

2 units (selection)

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Target This class acquires importance of the material evaluation using acoustic emission method and guided wave method that are prospective as advanced material evaluation methods in more serious environment. Also it acquires the development and the prospective trend since now of the green composite materials with natural fibers and biodegraded resin as one of the advanced composites.

Outline Non-destructive methods are more important in the material evaluation methods that have been performed widely since then. This class introduces the measuring fundamentals and the analysis using the acoustic emission method and guided wave detecting method, and also the characteristics and the up-to-date development trend of green composites with less environmental burden.

Style Lecture

Keyword *acoustic emission(AE), guided wave analysis, green composite*

Fundamental Lecture “**Material Engineering**”(0.2), “**Physical properties of materials**”(0.2)

Requirement Students are required to have a good understanding of fundamental knowledge of materials engineering.

Goal

1. To make clear the deformation and fracture dynamics of advanced materials by analysis of obtained AE signals.
2. To identify various types of defects and search for a plant life prediction using the guided wave propagating through materials.
3. To understand the high-performed and high-qualified green composite as one of the advanced materials with less environmental burden.

Schedule

1. Introduction of AE method
2. AE source characterization
3. AE behavior during deformation in advanced materials and its deformation mechanism
4. AE behavior due to microcracking in advanced materials and its fracture prediction technology
5. Up-to-date trend of material evaluation technology with AE method

6. Propagation theory of ultrasonics in materials with viscoelasticity, anisotropy, piezoelectricity and non-linearity
7. Propagation simulation of ultrasonics
8. Fundamentals of guided wave with SH mode plate wave
9. Guided wave to circumferencial and axial directions
10. Up-to-date research trend of guided wave
11. Concept of advanced composite materials
12. Classification of advanced composite materials and its application
13. Characteristics of advanced composite materials
14. Advanced composite materials and global environment
15. Development trend of green composite

Evaluation Criteria Assignments count 100%

Textbook Not used

Reference Will be introduced in the class.

Contents <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216664>

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

Contact

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