

2022 Spring, 4582-608 (WCU Program)
Electrochemical Energy Engineering, 전기화학에너지공학

LECTURER: Professor Yung-Eun Sung (성영은)

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OUTLINE

This class deals with electrochemical principles for the industrial electrochemistry, electrochemical engineering and technologies. After reviewing the basics of electrochemistry, this course will be continued to the applications such as electrodeposition, corrosion, electrolysis, battery, fuel cell, photoelectrochemistry, and so on.

전기화학의 기초 원리를 살펴본 다음, 이 원리가 전착, 부식, 수전해, 배터리, 연료전지, 광전기화학, 그리고 기타 전기화학 산업의 이해에 어떻게 적용되는지를 살펴본다. 전기화학 산업을 통해 전기화학을 더 깊이 이해할 필요가 있음을 보고, 또 이를 통해 학생들이 자신의 연구분야에서 응용 가능성을 찾아볼 수 있도록 하려는 것이 이 강의의 목적이다.

TEXTBOOK

Thomas F. Fuller, John N. Harb, Electrochemical Engineering, Wiley, 2018.

REFERENCES (참고문헌들)

Derek Pletcher, Frank C. Walsh, *Industrial Electrochemistry*, Blackie Academic & Professional, 1993.

오승모, 전기화학(3 판), 자유아카데미, 2019. (Seung Mo Oh, *Electrochemistry (English version)*)

Milan Paunovic, Mordechai Schlesinger, *Fundamentals of Electrochemical Deposition*, Wiley, 1998.

Denny A. Jones, *Principles and Prevention of Corrosion*, Macmillan, 1992.

Mathew M. Mench, *Fuel Cell Engines*, Wiley, 2008.

Robert A. Huggins, *Advanced Batteries*, Springer, 2009. (e-book in library, also in Korean)

Allen J. Bard, Larry R. Faulkner, *Electrochemical Methods*, Wiley, 2001

SCHEDULES (maybe be modified)

Introduction and basic principles (ch.1) (1 week)

Cell potential and thermodynamics (ch.2) (2 week)

Electrochemical kinetics (ch.3) (3 week)

Transport (ch.4) (4 week)

Electrode structures and configurations (ch.5) (5 week)

Analysis of electrochemical systems (ch.6) (6 week)

Batteries 1, 2 (ch.7,8) (7,8 weeks)

Fuel cells 1, 2 (ch.9,10) (9,10 weeks)

Electrochemical capacitors (ch.11) (11 week)

Energy storage & conversion (ch.12) (11 week)

Electrodeposition (ch.13) (12 week)

Industrial electrolysis (ch.14) (13 week)
Photoelectrochemical cells (ch.15) (14 week)
Corrosion (ch.16) (15 week)

GRADING (B⁺ & above ~ 80%, B⁰ & below ~ 20%, or Department guide)

Midterm Exam 40%, Final Exam 40%, Homeworks & Attendance 20 %

LECTURE ROOM & TIME: Rm #302-409, 11:00-12:15 Mon. & Wed.

OFFICE HOUR: Rm #302-721, 13:00-16:00 Mon. & Wed.

TA: Geumbi Na(나금비) Rm #302-1007, 02-880-9123, mstu2025@snu.ac.kr

* Due to COVID-19, lecture will be held online Zoom in March. However, I am going to give a lecture in Lecture Room 409 and I will stay there until 1 pm, so if you have any questions, please come to the classroom or use online zoom after class.