รูปภาพการสอน

Example of class video:
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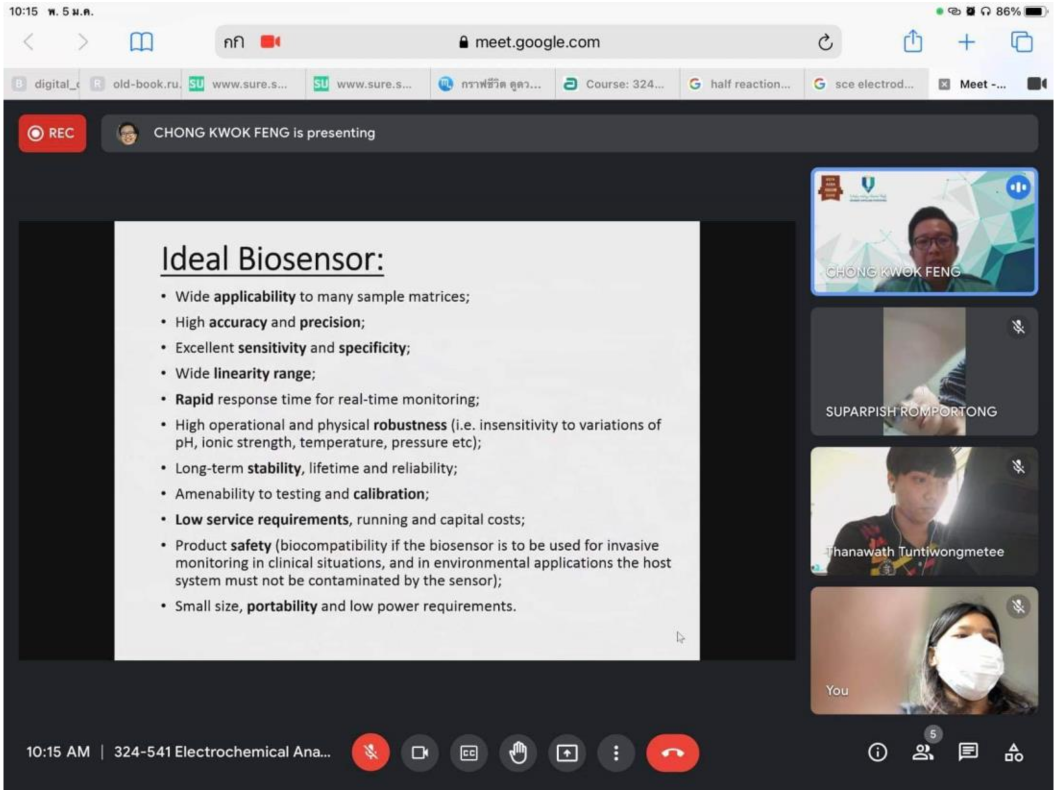
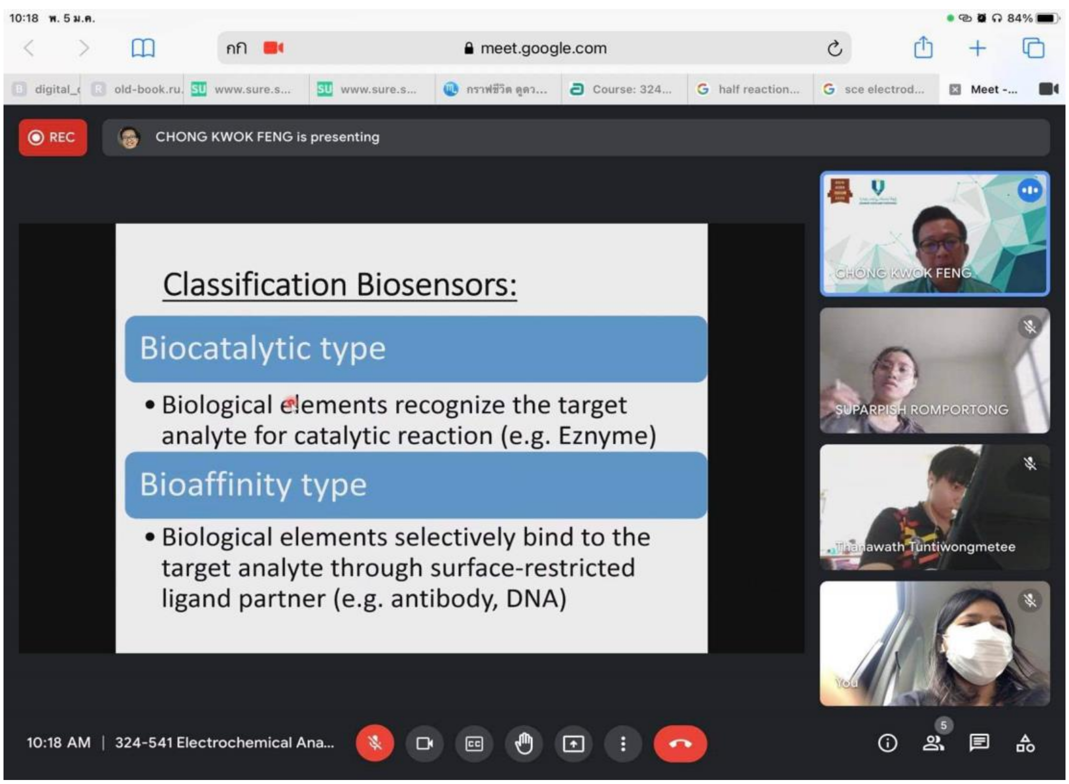
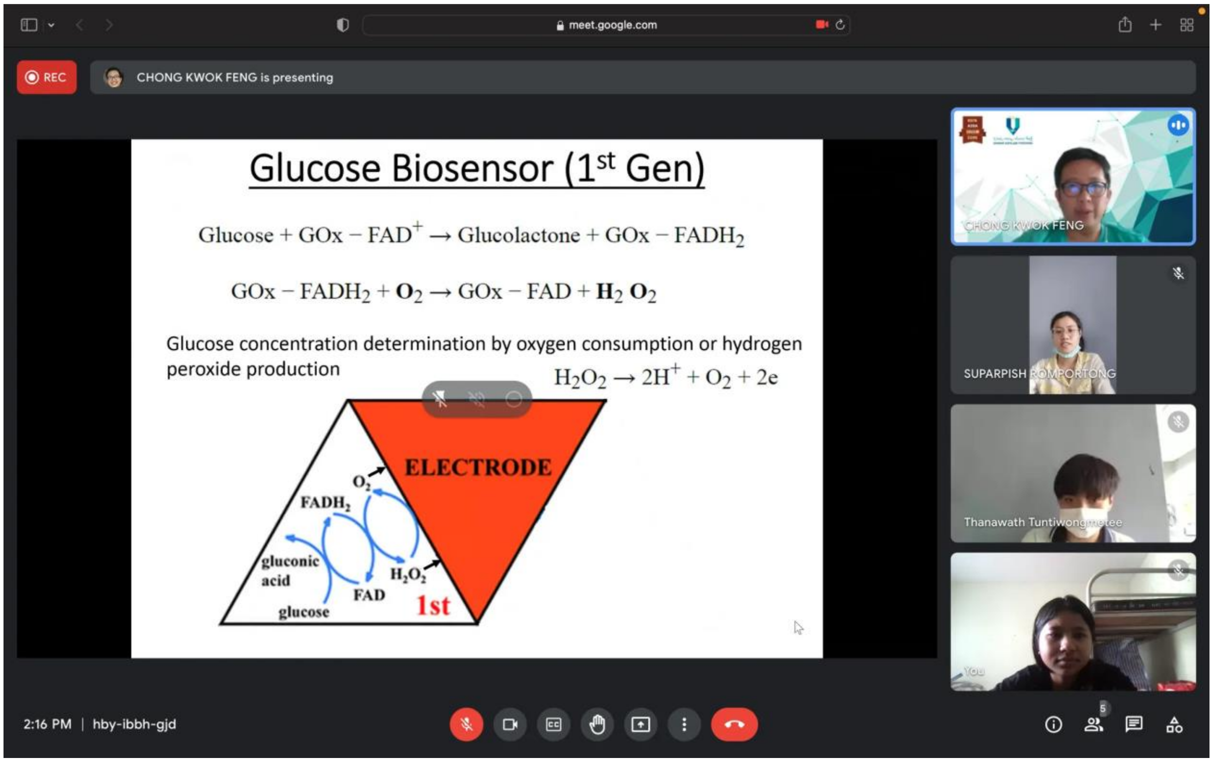

REC
CHONG KWOK FENG is presenting
Ideal Biosensor:
• Wide applicability to many sample matrices;
• High accuracy and precision;
• Excellent sensitivity and specificity;
• Wide linearity range;
• Rapid response time for real-time monitoring;
• High operational and physical robustness (i.e. insensitivity to variations of pH, ionic strength, temperature, pressure etc);
• Long-term stability, lifetime and reliability;
• Amenability to testing and calibration;
• Low service requirements, running and capital costs;
• Product safety (biocompatibility if the biosensor is to be used for invasive monitoring in clinical situations, and in environmental applications the host system must not be contaminated by the sensor);
• Small size, portability and low power requirements.
CHONG KWOK FENG
SUPARPISH ROMPORTONG
Thanawath Tuntiwongmetee
You
10:15 AM | 324-541 Electrochemical Ana...


REC
CHONG KWOK FENG is presenting
Classification Biosensors:
Biocatalytic type
• Biological elements recognize the target analyte for catalytic reaction (e.g. Eznyme)
Bioaffinity type
• Biological elements selectively bind to the target analyte through surface-restricted ligand partner (e.g. antibody, DNA)
CHONG KWOK FENG
SUPARPISH ROMPORTONG
Thanawath Tuntiwongmetee
You
10:18 AM | 324-541 Electrochemical Ana...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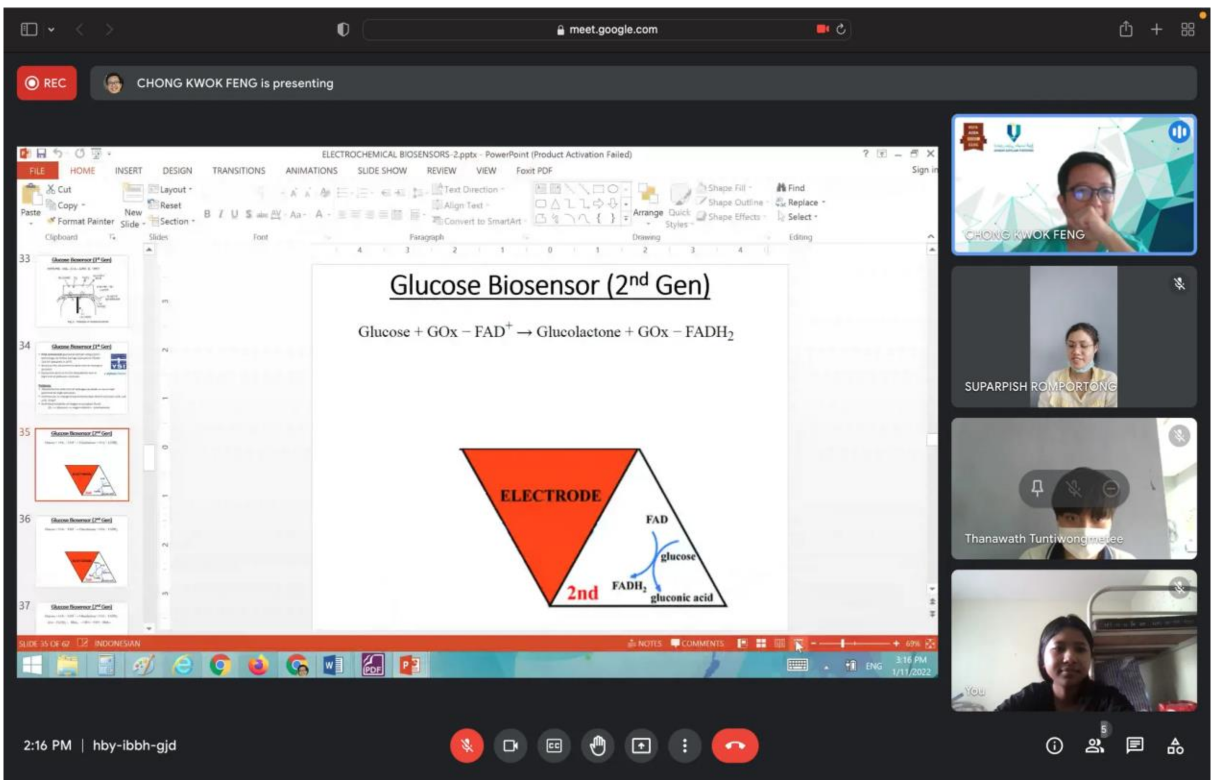
REC
CHONG KWOK FENG is presenting
Glucose Biosensor (1st Gen)
Glucose + GOx − FAD+ → Glucolactone + GOx − FADH2
GOx − FADH2 + O2 → GOx − FAD + H2 O2
Glucose concentration determination by oxygen consumption or hydrogen peroxide production
H2O2 → 2H+ + O2 + 2e
ELECTRODE
O2
FADH2
gluconic acid
H2O2
FAD
glucose
1st
CHONG KWOK FENG
SUPARPISH ROMPORTONG
Thanawath Tuntiwongmetee
You
2:16 PM | hby-ibbh-gjd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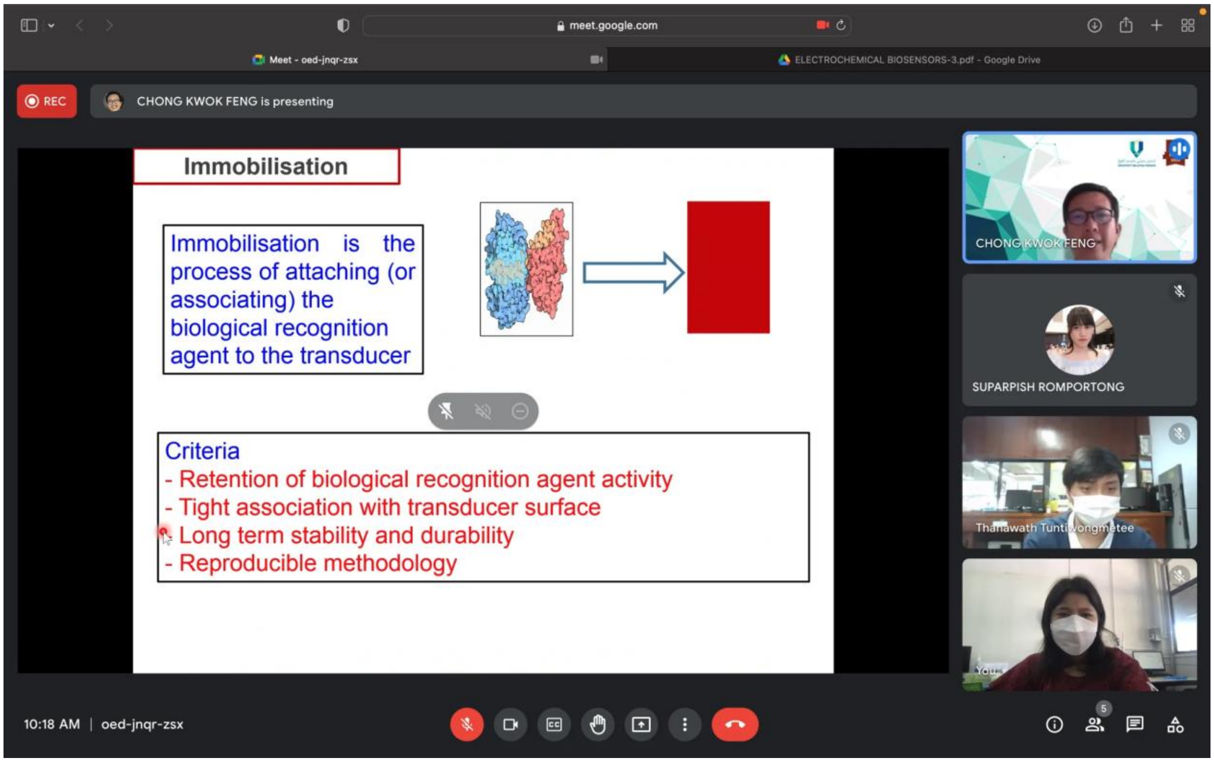
REC
CHONG KWOK FENG is presenting
ELECTROCHEMICAL BIOSENSORS-2.pptx - PowerPoint (Product Activation Failed)
Glucose Biosensor (2nd Gen)
Glucose + GOx − FAD+ → Glucolactone + GOx − FADH2
ELECTRODE
FAD
glucose
FADH2
gluconic acid
2nd
CHONG KWOK FENG
SUPARPISH ROMPORTONG
Thanawath Tuntiwongmetee
You
2:16 PM | hby-ibbh-gjd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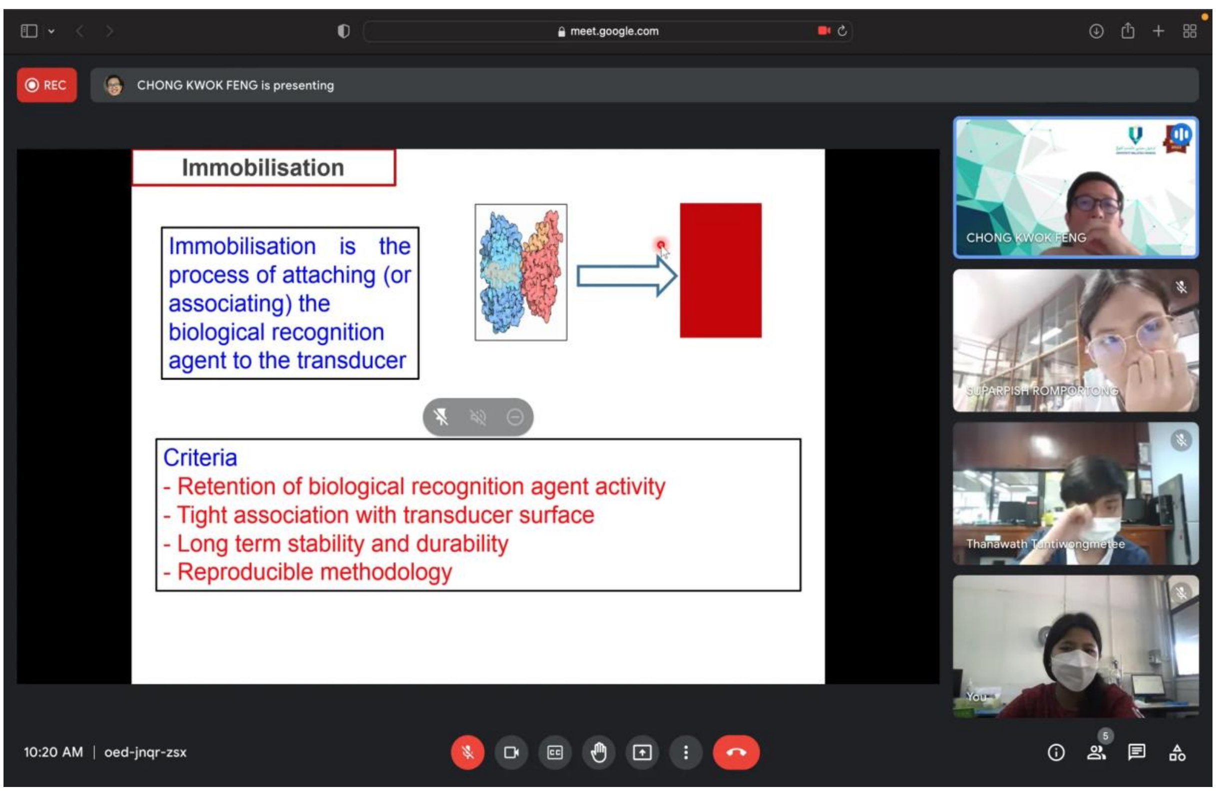
Meet - oed-jnqr-zsx
ELECTROCHEMICAL BIOSENSORS-3.pdf - Google Drive
REC
CHONG KWOK FENG is presenting
Immobilisation
Immobilisation is the process of attaching (or associating) the biological recognition agent to the transducer
Criteria
- Retention of biological recognition agent activity
- Tight association with transducer surface
- Long term stability and durability
- Reproducible methodology
CHONG KWOK FENG
SUPARPISH ROMPORTONG
Thanawath Tuntiwongmetee
You
10:18 AM | oed-jnqr-zsx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CHONG KWOK FENG
SUPARPISH ROMPORTONG
Thanawath Tuntiwongmetee
You
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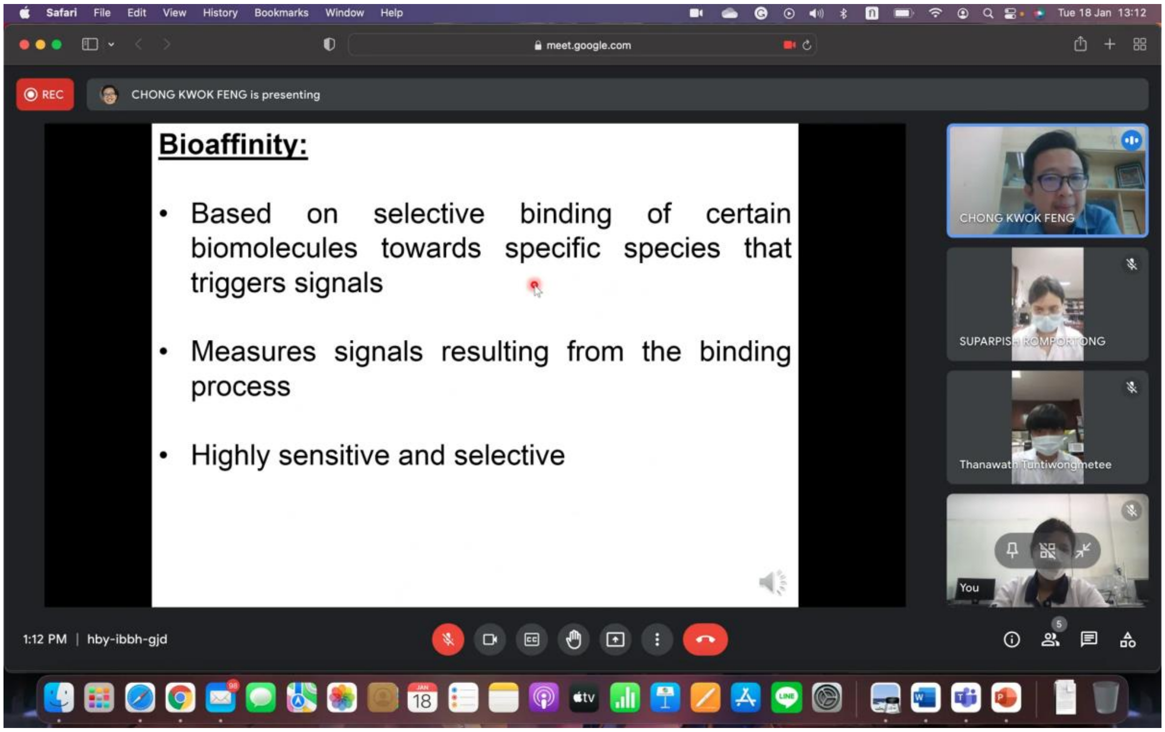
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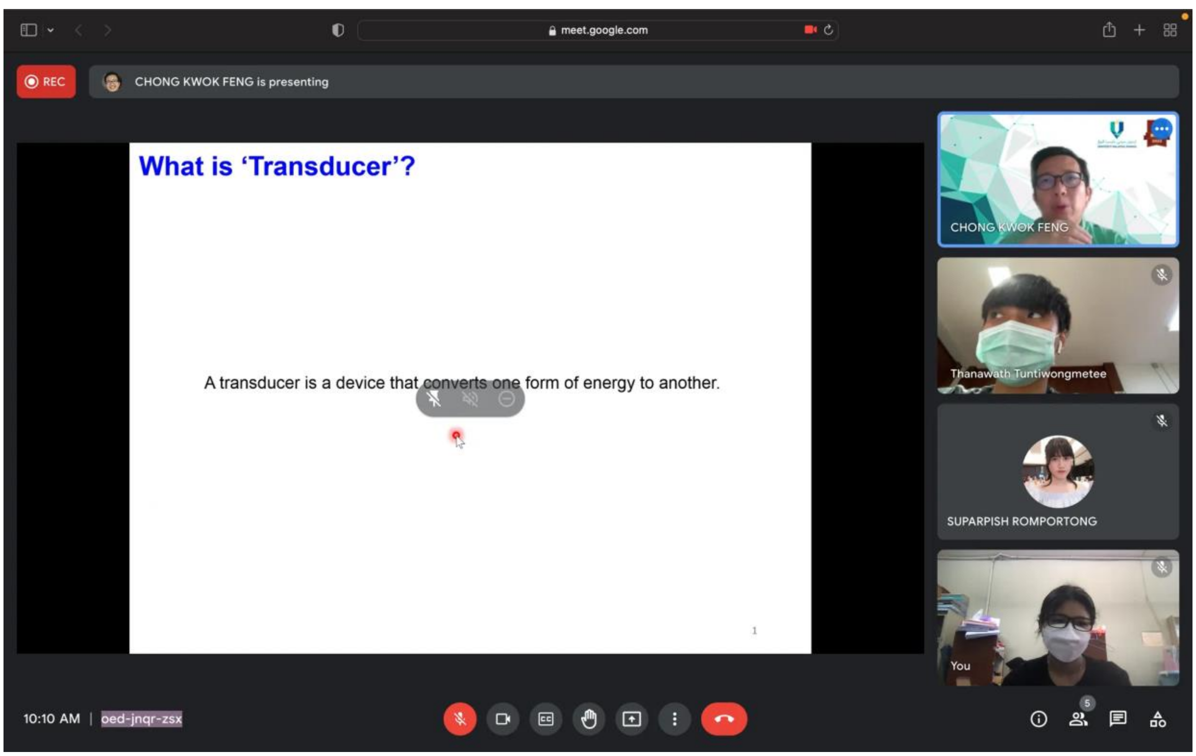
REC
CHONG KWOK FENG is presenting
Bioaffinity:
• Based on selective binding of certain biomolecules towards specific species that triggers signals
• Measures signals resulting from the binding process
• Highly sensitive and selective
CHONG KWOK FENG
SUPARPISH ROMPORTONG
Thanawath Tuntiwongmetee
You
1:12 PM | hby-ibbh-gjd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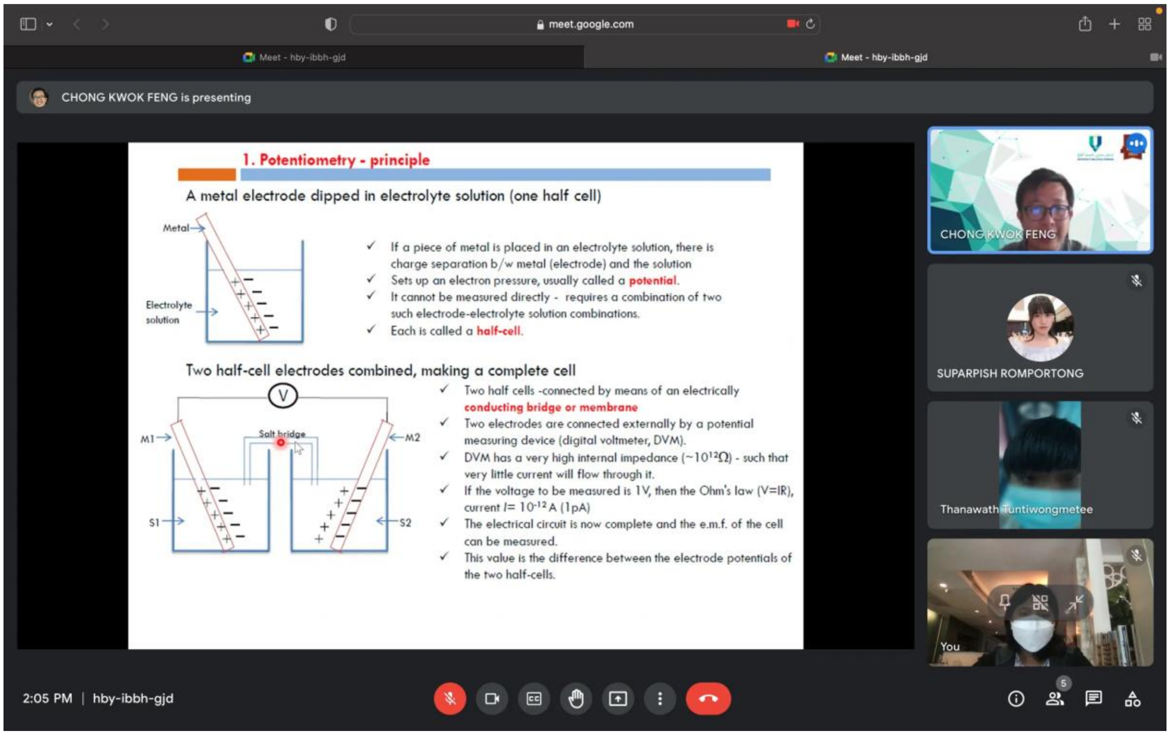
REC
CHONG KWOK FENG is presenting
What is 'Transducer'?
A transducer is a device that converts one form of energy to another.
1
CHONG KWOK FENG
Thanawath Tuntiwongmetee
SUPARPISH ROMPORTONG
You
10:10 AM | oed-jnqr-zsx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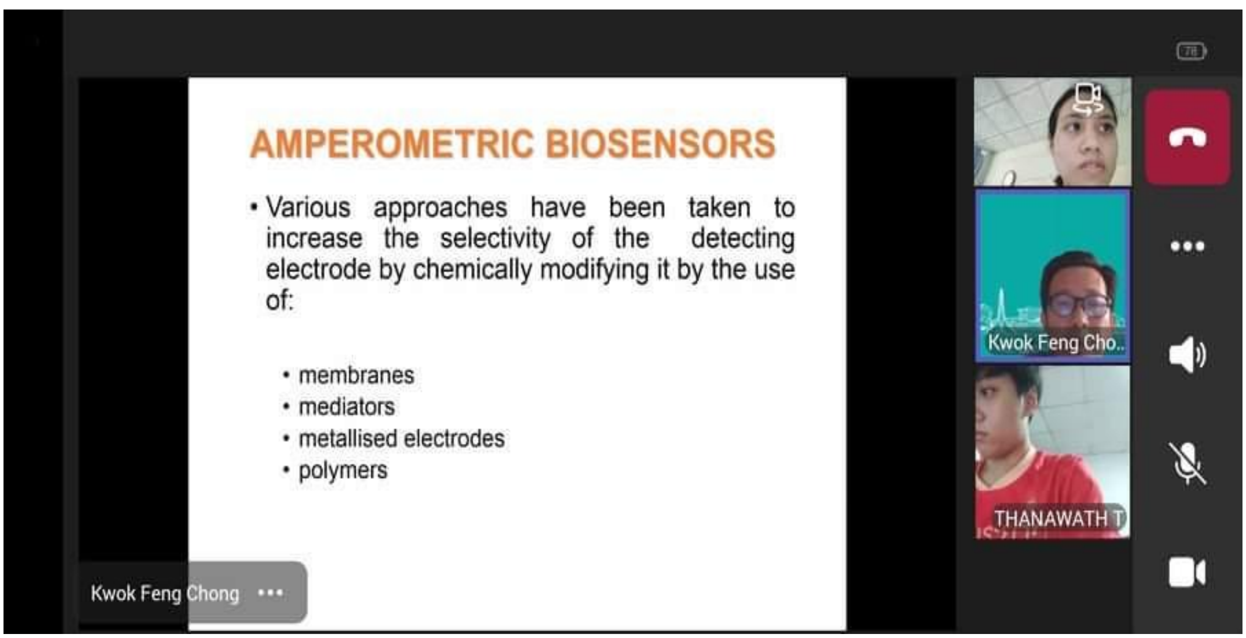
CHONG KWOK FENG is presenting
1. Potentiometry - principle
A metal electrode dipped in electrolyte solution (one half cell)
Metal
Electrolyte solution
If a piece of metal is placed in an electrolyte solution, there is charge separation b/w metal (electrode) and the solution
Sets up an electron pressure, usually called a potential.
It cannot be measured directly - requires a combination of two such electrode-electrolyte solution combinations.
Each is called a half-cell.
Two half-cell electrodes combined, making a complete cell
V
Salt bridge
M1
M2
S1
S2
Two half cells -connected by means of an electrically conducting bridge or membrane
Two electrodes are connected externally by a potential measuring device (digital voltmeter, DVM).
DVM has a very high internal impedance (~10¹²Ω) - such that very little current will flow through it.
If the voltage to be measured is 1V, then the Ohm's law (V=IR), current I= 10⁻¹² A (1pA)
The electrical circuit is now complete and the e.m.f. of the cell can be measured.
This value is the difference between the electrode potentials of the two half-cells.
CHONG KWOK FENG
SUPARPISH ROMPORTONG
Thanawath Tuntiwongmetee
You
2:05 PM | hby-ibbh-gjd


AMPEROMETRIC BIOSENSORS
Various approaches have been taken to increase the selectivity of the detecting electrode by chemically modifying it by the use of:
membranes
mediators
metallised electrodes
polymers
Kwok Feng Chong
Kwok Feng Cho..
THANAWATH T