

Korea-EU Horizon Europe Researchers Networking Forum on Energy & Advanced Mobility

Ho Seok Park

**Professor
Director
Director**

**School of Chem. Eng., SKKU
Center for 2D Redox Energy Storage
Center for Next-Gen. Energy Materials**

**Energy Storage
Energy & Chemical Conversion
Energy Materials**



Sungkyunkwan University (SKKU)

87th THE Ranking in 2026
(2nd in Private U, 3rd in Comprehensive U)



627 Years of Academic History

**Sungkyunkwan
founded**

1398

Reformed to
modern university

1895

Suwon Campus
opened

1978

1475

Jongyeonggak
created

1953

Graduate School
established

1996

SAMSUNG

Samsung Group joins
University Foundation

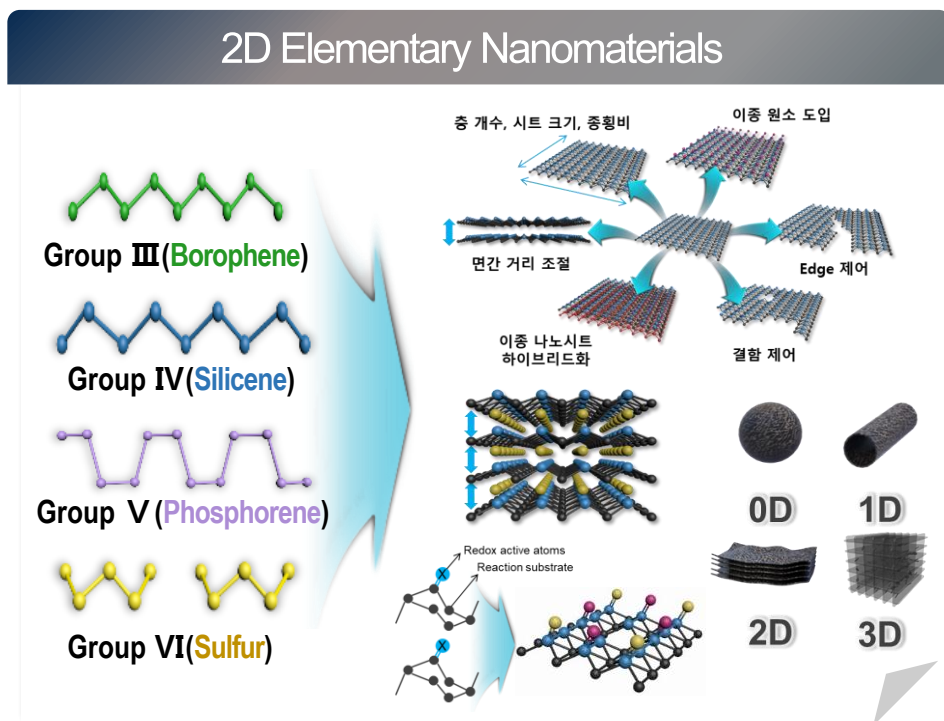


2025

Global Leading
University

Center for 2D Redox Energy Storage (2DRES)

- Controlling surface chemistry of 2D elementary nanomaterials for a highly efficient surface redox mechanism
- Constructing multiscale and porous structures to maximize energy storage performances
- Creating new functionalities to apply 2D elementary materials for active, hosting, passivating, and catalytic materials



Since 2020

Phase I
(2020~2022)

High performance

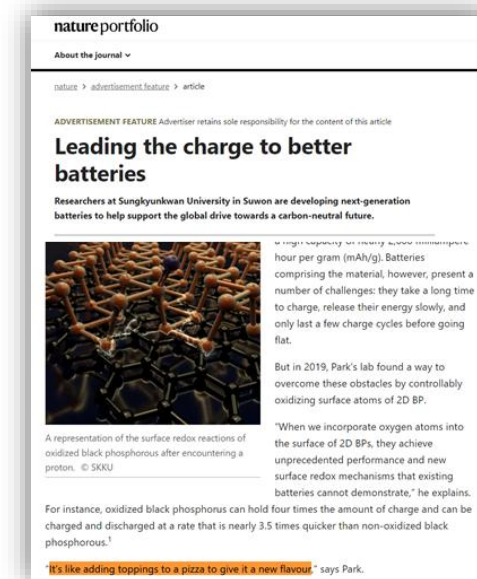
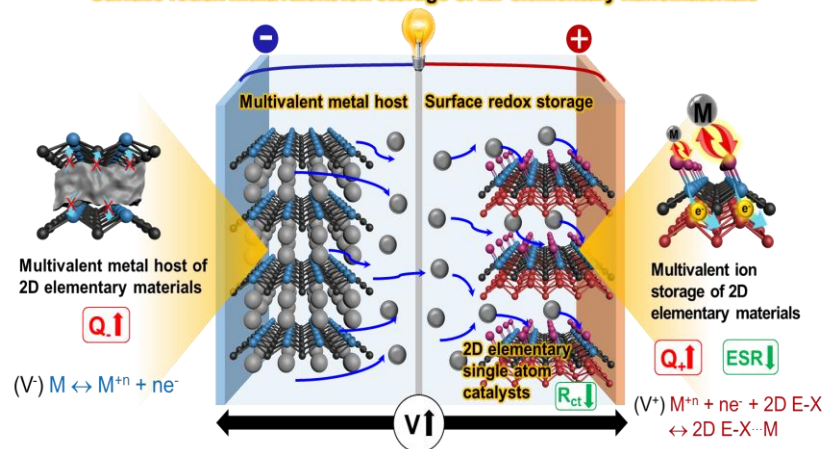
Phase II
(2023~2025)

New functionality

Phase III
(2026~2028)

Stability

Surface redox multivalent ion storage of 2D elementary nanomaterials



Nature 2022; Nat Mater 2019

Center for 2D Redox Energy Storage (**2DRES**)

Charge storage/transfer/separation at the “Surface & Interface”

Surface & topological chemistry

- 2D elementary materials (BP, B)
- Carbon nanomaterials

Nat. Mater., 2019, **Nat. Commun.**, 2021

Surface & Interface for batteries

- Artificial interface & host for metal anode (Li, Na, Zn)
- Multifunctional electrolyte additives
- High entropy Si alloys

JACS, 2024, **EES**, 2024, **Nat. Commun.**, 2025

Fast electrochemistry at EDL

- Surface redox pseudocapacitance
- Capacitor under extreme conditions

Joule, 2019; **Chem. Soc. Rev.**, 2022;

Electrosorption & electrocatalysis

- CDI for desalination & recycling
- Electrocatalysts for conversion materials
- CO₂, NO_x, SO_x separation & fixation

AM, 2021, **EES**, 2022, **Joule**, 2025

2DRES members

- PI: Ho Seok Park
- 3 research professors
- 4 postdocs
- 40 Ph. D candidates
- 3 Visiting scholars
- 1 Administrator

Total 52 now

Performance

- >380 papers
- 3 technology transfer
- **Projects from industry** (Samsung, LG, Posco...)



Our Interest in **Horizon Europe 2026-2027**

Batteries & Hydrogen & CCUS

- **HORIZON-CL5-2026-09-D2-01**: Producing battery-grade materials for electrodes through sustainable processing and refining of raw materials or developing bio-based materials (BATT4EU Partnership)
- **HORIZON-CL5-2027-04-Two-Stage-D2-07**: Novel approaches towards next-generation battery concepts, leveraging the enabling role of innovative advanced materials (BATT4EU and IAM4EU Partnerships)
- **HORIZON-CL5-2027-05-D2-08**: Demonstration for Long-duration Battery Energy Storage Systems (BATT4EU Partnership)
- **HORIZON-CL5-2026-10-D2-03**: Integrated Production and Product Development for Next-Generation Lithium-based Batteries for Mobility (BATT4EU and Made in Europe Partnerships)
- **HORIZON-CL5-2027-02-D2-06**: Sustainable and Competitive Cell Production Techniques for Lithium-ion And Sodium-ion Batteries (BATT4EU Partnership)
- **HORIZON-CL5-2026-04-Two-Stage-D3-02**: Next generation of renewable energy technologies

Keywords: carbon and bioderived materials for LIB, SIB, and aqueous batteries, Dry electrode process



Contact Details

Please feel free to contact with me if
you have any inquiry or suggestion.

<http://esem.skku.edu>

Email: phs0727@skku.edu

Thank you very much!