

Cooperation Profile

Date of Submission: 12-04-2026

Relevant topic(s) in the work program (call identifier & name of the topic(s))

Call Identifier	Topic Name
HORIZON-CL4-2027-01-MAT-PROD-22	Innovative advanced materials and new production processes – reducing dependencies on Critical and Strategic Raw Materials (IA)
HORIZON-CL4-2027-01-MAT-PROD-06	Circular innovative advanced materials: facilitating the transition from design to markets (RIA) (Innovative Advanced Materials for the EU and Made in Europe partnerships)
HORIZON-CL4-2027-05-DIGITAL-EMERGING-03	Advanced integrated photonic devices for extended features and ultra-low power consumption (RIA) (Photonics Partnership)
HORIZON-CL4-2027-02-MAT-PROD-32-two-stage	Efficient energy input from renewable sources and energy management in the process industries (IA) (Processes4Planet and Innovative Advanced Materials for the EU partnerships)
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-CL5-2027-07-D3-16	Industrial processes and equipment for innovative, reliable and scalable tandem technologies (EUPI-PV Partnership)

Description of your expertise (up to 1000 characters)

Prof. Se-Hun Kim's research group at Jeju National University (JNU) specializes in advanced energy materials, 2D van der Waals heterostructures, and quantum/topological materials. Core activities combine density functional theory (DFT) first-principles simulations with experimental validation, focusing on: (i) MXene-based photocatalytic systems for renewable H₂ production and CO₂ reduction; (ii) interface charge-transfer and band engineering in 2D/vdW heterostructures; (iii) thermoelectric materials with enhanced figure of merit (zT); and (iv) topological/quantum materials including nonlinear Hall-effect systems. JNU is fully eligible as a Horizon Europe partner following South Korea's association in 2025.

Keywords describing your expertise (up to 10 key words)

2D Materials / MXenes	Photocatalytic H ₂ Production	DFT / First-Principles Simulation	Thermoelectric Materials	Topological Quantum Materials
vdW Heterostructures	Band Engineering	CO ₂ Reduction	Semiconductor Physics	Renewable Energy Materials

Organization information

Organization: Jeju National University
Type of organization: <input checked="" type="checkbox"/> University or College <input type="checkbox"/> Research Institute <input type="checkbox"/> Industry (Large) <input type="checkbox"/> Industry (SME) <input type="checkbox"/> Public Body <input type="checkbox"/> Other
Previous participation in an EU project? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes:
Web page: https://www.jejunu.ac.kr

Description of your organization:

Jeju National University (JNU) is a nationally chartered research university on Jeju Island, Republic of Korea, with approximately 15,000 students and 700 faculty members across natural sciences, engineering, education, medicine, law, and the humanities. JNU has a long track record of international research collaboration through NRF-funded bilateral programs.

Following South Korea's formal association to Horizon Europe (2025), JNU researchers are now fully eligible to apply for and participate in all Pillar II collaborative research projects. Prof. Se-Hun Kim's laboratory in the Faculty of Science Education offers internationally competitive expertise in computational and experimental advanced materials science, supported by state-of-the-art characterization infrastructure and active partnerships with research groups in Europe, Asia, and North America.

Contact details

Contact Person	Prof. Se-Hun Kim
Telephone	+82-64-754-3285
E-mail	spinjj@jejunu.ac.kr
Country	Republic of Korea
ORCID	https://orcid.org/0000-0002-1695-7259
Google Scholar	https://scholar.google.com/citations?hl=en&user=K023NrYAAAAJ