Engineering Nanocarbon Surface and Porosity for Electrochemical Dominance: Synthesis-by-Design Approaches

Prof. Jong Hun Kang

School of Chemical and Biological Engineering and Institute of Chemical Processes,
Seoul National University, Seoul, Korea 08826

Jong Hun Kang received his B.S. (2009) and M.S. (2014) in Materials Science and Engineering from Seoul National University (SNU). During his master's training under Prof. Chong Rae Park, he studied nanocarbon synthesis and surface chemistry, with a particular focus on chemistry of graphene oxide (GO) synthesis. His work elucidated how the post-water-addition oxidation reactions in the Hummers' method—and the extent of this oxidation—govern the resulting GO physicochemical properties, its thermal decomposition behavior, and the characteristics of reduced graphene oxide (rGO) produced as a pyrolysis product. He earned his Ph.D. (2019) in Chemical Engineering from the California Institute of Technology (Caltech) under Prof. Mark E. Davis, where he focused on zeolite synthesis and catalysis. His research reported and advanced synthesis strategies for multiple novel zeolites, including CIT-13, CIT-14, CIT-15, CIT-16P, as well as chiral zeolites, and he first established the first general shape selectivity theory that directly correlates zeolite structures and product distributions in the methanol-to-olefins (MTO) reaction, which he named the cage-defining ring theory (2019).

After finishing his postdoctoral research with Prof. Yuriy Román at MIT in 2020, he joined SNU Chemical and Biological Engineering department, pursuing catalyst and reaction engineering research rooted in two core strengths—nanocarbon and zeolite synthesis—spanning both established processes (catalytic cracking, steam and dry reforming, olefin metathesis, aromatization) and emerging, environmental-driven topics such as natural-gas valorization, waste valorization, hydrogen production, water electrolysis, and battery electrode development through a diverse portfolio of national and industrial projects.