

## Chemical Transformation and Assembly of Nanoparticles for Electrochemical Energy Application

하돈형<sup>†</sup>  
중앙대학교  
(dhha@cau.ac.kr<sup>†</sup>)

For the advanced synthesis of nanoparticles (NPs), chemical transformations of as-synthesized NPs are an emerging and powerful method to tailor the composition and morphology of NPs. Nanosynthetic chemistry has centered on creating new NPs using these transformations. However, beyond works employing empirical qualitative analysis, few works have addressed the underlying atomic mechanisms for these transformations. Works using chemical transformations of NPs for applications are also an under-studied field. This presentation spans from fundamental understandings of the atomic structural evolutions and mechanisms in chemical transformations to use of these methods to create and characterize new structures, to assembly of those NCs through electrophoretic deposition, and to the final applied stage of electrocatalysts for hydrogen evolution with metal phosphide NPs. We demonstrated that hydrogen evolution reaction catalytic activity of NPs can be improved by synthetic control such as composition, doping, and crystallinity, as well as deposition control through utilization of electrophoretic deposition technique.