

## Role of Halide Ions for Controlling Morphology of Copper Nanocrystals in Aqueous Solution

정의영, Tang zengmin, 유태경, 김우식<sup>†</sup>

경희대학교

(wskim@khu.ac.kr<sup>†</sup>)

The influence of halide ions on the morphology-controlled synthesis of Cu nanocrystals in the aqueous phase has been studied. Cu nanocrystals with controlled shapes, including 2D plates, 1D wires, and 3D polyhedral particles were obtained by a reduction reaction between Cu-halide and ascorbic acid, and branched polyethyleneimine (BPEI) was used as a stabilizing agent in the process. Density functional theory (DFT) calculations showed that this morphological control was caused by the selective adsorption of halide ions depending on the facets of the Cu nanocrystals. The thickness and lateral size of the Cu nanoplates were tuned easily using a co-stabilizer, the addition of Br<sup>-</sup> ions, and varying the pH of the reaction solution. Overall, this synthetic procedure could be a potential method for the mass synthesis of morphology controlled Cu nanocrystals for industrial applications because of the superior reaction conditions, such as the air atmosphere, low reaction temperature, water-phase-based synthetic condition as well as the use of nontoxic and inexpensive reagents.