

Silver Ion Adsorption and Photocatalytic Degradation for Purifying Water using Nanostructured Graphitic Carbon Nitride ($g-C_3N_4$)

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Purifying water is crucial chemical process to make clean drinking water nowadays. Among the contaminants, heavy metal ions and organic materials have to be removed due to keep public health and life.

We developed various nanostructured carbon nitride ($g-C_3N_4$) which is trigonal nitrogen linked heptazine structure stacking in graphitic manner, i.e. hollow sphere and 3D cubic symmetry morphologies, using nanocasting method to get large surface area and expose functional groups.

Herein, we demonstrated adsorption process to remove silver ions in aqueous phase with respect initial concentration, adsorption time, temperature, and competitive adsorption character. Among various structure of $g-C_3N_4$, the 3-d cubic $g-C_3N_4$ can selectively remove silver ions up to 417 mg/g due to its large surface area and pore volume. Degradation of organic dye using photocatalytic reaction was also preceded with bare- $g-C_3N_4$ and silver ion assisted $g-C_3N_4$ based on semiconductor property of $g-C_3N_4$.