DOPED GRAPHITIC CARBON NITRIDES

Technology #015037-shuai

A growing number of persistent organic micro-pollutants such as pharmaceuticals and personal care products, pesticides, and herbicides are frequently observed in natural and treated water. Such contaminants are recalcitrant to conventional water and wastewater treatment and may pose risks to human and ecological systems even at very low concentrations. In addition, persistent pathogens, which maybe airborne or water-borne, can also cause the spread of infectious diseases. Thus, the effective control against such pathogens and micropollutants is important to protect the public health.

George Washington University researchers invented a carbon-doped graphitic nitride (g-C3N4) photo-catalyst composition that can, in the presence of UV or visible light, degrade persistent organic micro-pollutants. In other words, this novel g-C3N4 composition can, under UV or regular light, effectively treat pharmaceuticals, pesticides, herbicides, and other organic pollutants in water or wastewater. Furthermore, the g-C3N4 composition can be coated to surfaces of household or public items where the coating can kill harmful viruses, bacteria, and other pathogens and thus improving human hygiene.

This novel carbon-doped graphitic nitride photo-catalyst maybe applied to a variety of household or industrial applications, including as a coating on food packages, plates, and kitchen counter-top. In presence of UV or visible light, the novel photo-catalyst can help degrading harmful organic pollutants and pathogens and thus improve health and hygiene. Similarly, the carbon-doped graphitic nitride photo-catalyst can be coated onto hand-gripping surfaces of furniture, doors, and other appliances to help degrade bacteria and virus and therefore slows the spread of diseases or allergy-causing substances.

Applications:

• Water Treatment
• Anti-bacterial coating on household items to improve hygiene and to reduce the spread of diseases or allergy-causing substances

Advantages:

• Catalyst can degrade bacteria, viruses, or other small organic pollutants in presence of visible or UV light
• Can be readily coated onto surfaces of household items such as food container surfaces, doorknobs, and cutting boards
Inventors

Dameng Shuai, Assistant Professor

Professor Danmeng Shuai’s research group specializes in water treatment, environmental chemistry, catalysis, and nanotechnology. Our group aims to apply materials-based strategies to address water sustainability issues. Our research focuses on advanced treatment technologies (including oxidation, reduction, and separation) for water purification with reduced energy footprint, production of renewable energy, and resource recovery from the waste.

Qimin Zheng, Phd Student

Research Interests: Advanced Materials for Innovative Water & Air purification and Renewable Energy (e.g. Visible-light photocatalysis, Membrane technology, Solar cell)