



**Inventors:**



*Dr. Dongye Zhao*

Elton & Lois Huff Professor  
Dept. of Civil Engineering

*Wen Liu*

Postdoctoral Researcher  
Dept. of Civil Engineering

**References:**

Liu, et al. Environ. Sci.  
Technol. Lett., 2016  
[doi:10.1021/acs.est.6b02623](https://doi.org/10.1021/acs.est.6b02623)

**Contact:**

Brian Wright  
Auburn University  
Innovation Advancement  
& Commercialization  
334-844-7544  
[physsci@auburn.edu](mailto:physsci@auburn.edu)  
[iac.auburn.edu](http://iac.auburn.edu)  
Ref: Water Remediation

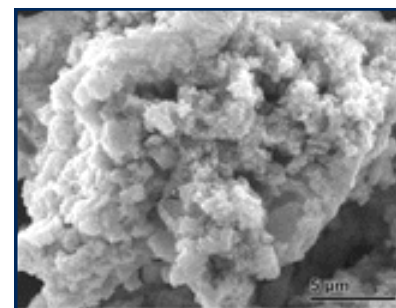


**View More  
Available  
Technologies**

## Photo-Regenerable Material for Remediation of Contaminated Water

*Auburn University is seeking a licensee or development partner for a patent pending technology for environmental remediation or other filtering applications.*

**Overview:** Polycyclic aromatic hydrocarbons (PAHs) and per- and polyfluoroalkyl substances (PFAS) are established pollutants to waterways. PAHs are a common byproduct from the burning of fossil fuels and have toxic and carcinogenic properties. PFAS are widely used as surfactants and protective coatings and are associated with a wide variety of adverse health effects. The EPA's Priority Pollutant List contains several compounds in these classes. Novel materials have been developed to efficiently accumulate and degrade PAHs and PFAS as well as other contaminants. The single material is able to both collect the target and break it down. The capacity and activity remain high through multiple cycles, needing only light to catalytically degrade the target. Existing remediation techniques may require multiple steps to isolate and degrade a contaminant, but this technology is suitable for continuous use in static conditions.



**Advantages:**

- **REUSABLE** - Material maintains capacity and activity.
- **EFFECTIVE** - Contaminant is >99% degraded.
- **SIMPLE** - One step to adsorb and degrade pollutant.

**Description:** PAHs and PFAS have become common pollutants in soil and water, causing ecological damage in addition to the toxic threat posed to humans. Current remediation techniques are inadequate for cost-effective degradation of the contaminants. Auburn's novel technology can improve over existing strategies.

A scaffold of activated charcoal is used to support a network of titanate nanotubes (TNTs) in this patent pending material. The activated charcoal also efficiently adsorbs common contaminants such as PAHs, which is a common current strategy for filtering water. The supported TNTs use UV light, such as that from the sun, to catalytically photodegrade the trapped contaminants, neutralizing the threat and restoring the filtering material to its original state. This cycle can be repeated, effectively remediating large amounts of pollution with only a small mass of the unique compound.

Existing adsorption-based techniques struggle to regenerate the adsorbents, even after removal from the contaminated site. Catalytic degradation techniques struggle to effectively address PAHs and PFAS due to low interaction times. By combining adsorbing and photocatalytic properties, this one material can successfully address these shortcomings and effectively remediate the polluted area.

**Status:**

- US Patent ([10,987,653](#)) and two additional non-provisionals (including [20210206670](#))
- Available for exclusive or non-exclusive licensing.
- Has been shown in a laboratory setting to efficiently (>99%) degrade contaminants while maintaining high capacity and activity through multiple cycles.

