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## Photo-Catalytic Oxidation of Environmental Pollutants

AzTE Case #531

## Background

Arizona State University

Dr. Gregory Raupp

#### Dr. Lynette Dibble

Inventors

Arizona State University

## Intellectual Property Status:

U.S. Patent 5,045,288

# Potential Applications Industrial Processes

available.

Water Treatment Plants

**Invention Description** 

Groundwater Treatment and Cleanup

## **Benefits and Advantages**

• Ambient Temperature Operation – The reaction takes place at ambient temperature, eliminating the need for costly heating or cooling equipment.

The future availability of groundwater as a source of potable water is jeopardized by the widespread occurrence of organic contaminants in water

supplies. Of particular concern are volatile organic compounds (VOCs) such as trichloroethylene (TCE), and other contaminants such as polychlorinated

biphenyls (PCBs). These materials are carcinogenic. Current treatment methods usually shift the contaminant to another medium, rather than

Researchers at Arizona State University have developed a ultraviolet-driven heterogeneous photocatalysis technique capable of converting many groundwater pollutants into non-harmful compounds. A titanium dioxide catalyst is provided in combination with ultraviolet illumination in a transparent fluidized bed photoreactor. Contaminated water is passed through the reactor, and the harmful materials are oxidized at the catalyst and converted to benign compounds. This technique can be used to eliminate or mitigate a broad class of pollutants, including VOCs, PCBs, chloroform, dichloromethane, phosphates, paraffins, olefins, and alcohols. The system can be readily integrated into existing water treatment facilities.

A low-cost, low-power, highly effective water treatment system is now

converting the contaminants to environmentally benign compounds.

- **Highly Effective** The process is more than 99% effective at oxidizing many harmful compounds.
- **Highly Efficient** The process uses near-wavelength ultraviolet light (around 450nm), minimizing lighting costs.

## Contact

Bill Loux Director of Business Development Arizona Technology Enterprises, LLC (AzTE) 480.884.1996 main 480.884.1992 desk Email: bloux@azte.com