

# TECHBRIEF

## STABLE IMMOBILIZED AMINE SORBENTS FOR THE DE-COLORATION OF WASTE WATERS

### OPPORTUNITY:

The U.S. Department of Energy's National Energy Technology Laboratory (NETL) has developed a system and method for combining polyamines, which immobilizes the dye-absorbing amine sites within low cost, porous silica particles. The innovation has the potential to remove organic-based colorants and pollutants from different water sources. This invention is available for licensing and/or further collaborative research from NETL.

### OVERVIEW:

This innovation can covalently immobilize dye-absorbing amine sites with low cost, porous silica particles. The sorbents have the potential to remove other organic-based colorants and pollutants from different water sources.

### SIGNIFICANCE:

This invention:

- Presents fast and easily prepared immobilized amine sorbents that contain polyamines, chemical cross-linkers, and silica that are structurally stable
- Captures a variety of dye and colorant species from flowing aqueous streams
- Is recyclable over multiple cycles
- Shows promise for commercial-scale processes involving colorant removal from flowing aqueous streams or stationary aqueous environments
- Has a low raw material cost, recyclability and is free of sodium and calcium adsorptions indicating that the sorbent will capture pollutant dyes in the presence of accompanying additives from a variety of water sources like textile runoff and drinking water

### APPLICATIONS:

Anticipated uses of the invention primarily include any flowing or stagnant aqueous system with dye materials including drinking water, ponds, rivers, lakes, seawater, and groundwater. Some key sources for the dye can be from textile waste water streams, food processing waste water streams, and coffee bean waste waters. Alternative uses of the invention includes the adsorption of toxic organic materials that bear structural similarity to the dye molecules.

(continued)



**FOR MORE INFORMATION:**

Customer Service:  
**1.800.553.7681**

626 Cochran's Mill Road  
P.O. Box 10940  
Pittsburgh, PA 15236-0940  
412.386.4687

3610 Collins Ferry Road  
P.O. Box 880  
Morgantown, WV 26507-0880  
304.285.4764

1450 Queen Avenue SW  
Albany, OR 97321-2198  
541.967.5892

**RELATED PATENTS:**

U.S. Patent No: 10,836,654

Issued: 11/17/2020

Title: Stable Immobilized Amine Sorbents for Removal of an Organic Contaminant from Wastewater

Inventors: McMahan L. Gray, Brian W. Kail, Quiming Wang, Walter C. Wilfong

NETL Reference No: 17N-18