Safer Groundwater

BRIAN ALBERT
BS ’10 CHEMICAL ENGINEERING

Brian Albert’s work in the laboratory of Chemical Engineering Professor Alan West is helping lead to the first field test of groundwater for hazardous ammunition compounds.

Albert is working on a project to develop a portable and highly sensitive electrochemical sensor of ammunition compounds in groundwater. Currently, such testing can be done only by taking samples to laboratories.

He has been mentored by the project’s leader, Lt. Col. Robert Bozic of the U.S. Military Academy and an adjunct associate research scientist in the Department of Chemical Engineering, and, since his first semester on campus working in the lab, he has taken on a greater role in the research.

“Initially, I was responsible for obtaining current response vs. concentration calibration curves for TNT and RDX (an explosive nitroamine) in salt water using a rotating disc electrode and solutions prepared in the laboratory,” he says. “As the project progressed, I helped construct microfluidic devices via drilling and resin casting. More recently, I will be obtaining kinetics data on peptide adsorption of TNT.”

Albert said that long-term monitoring is required at ammunition disposal locations, since TNT is hazardous even at parts per billion concentrations.

“A portable electrochemical technique to be used on-site would be more cost-effective and convenient,” he says.

Albert is inspired by his participation in the project to pursue a PhD in either chemical engineering or materials science. His long-term goal is to become a professor and lead a research group focused in energy-related areas, such as photovoltaics and batteries, subjects in which he has already done some research.

“In the summers of 2006 and 2007 at Brookhaven National Laboratory, I was assigned to conduct chemistry research that had potential applications to novel solar energy technologies,” he says. “Because I already had a general interest in alternative energy, after this experience I focused my curiosity on photovoltaic research and sought research opportunities in that area.

“My research focused on fabricating light trapping structures for silicon thin film photovoltaic cells. These photonic structures would help the cell absorb more incoming radiation, thereby increasing the solar cell’s efficiency.”