The Long Term Monitoring of Munitions Constituents

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ABSTRACT:

Long term monitoring of waste disposal sites for Munitions Constituents, MCs, using the Environmental Protection Agency Method 8330A, high performance liquid chromatography, is a costly analytical technique for which there is not a current comparable alternative. This has inspired research and development of fast, low cost techniques to detect parts per billion concentrations of MCs such as such as 2,4,6-TNT, 2,4-DNT, 2,6-DNT, 1,3,5-TNB, 1,3-DNB and Tetryl as well as other MCs in ground water. In collaboration with the U.S. Army Engineer Research and Development Center in Vicksburg, MS, Columbia University Department of Chemical Engineering and the Department of Chemistry and Life Science at the United States Military Academy have on-going research efforts combining electrochemical engineering, microfluidics, and protein engineering with a goal of developing engineering fundamentals to enable *in-situ* detection of MCs. Recent efforts included examination of adsorptive effects of MCs to a gold rotating disc electrode surface endowed with an alkanethiol self-assembled monolayer. This work increased understanding of the system parameters for future optimization. The current focus is on development of methods that will selectively detect concentrations of an MC from roughly nanomolar quantities to reliably detectable levels via electrochemical methodologies using a peptide separation unit in line with a electrochemical sensor.

KEYWORDS: munitions constituents, rotating disk electrode, self-assembled monolayer,

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