AzTE Arizona Technology Enterprises

www.azte.com

Radical Activated Cleavage of Biologics and Microfluidic Devices Using the Same

AzTE Case # M03-057

Inventors

Mark Hayes, PhD

Associate Professor

Dept. Chemistry and Biochemistry, Arizona State University

Barbara Jones, PhD

NIST

Invention Description

Tryptic digests with the subsequent analysis of the fragments produced are frequently used to characterize proteins. Such digests are limited by the amino acid specificity of the digesting enzyme (K and R in the case of trypsin). The analysis of fragments may also be complicated by self-digestion of the enzyme.

The present invention provides a method for the digestion of proteins and other biomolecules by the *in situ* production of hydroxyl radicals from an excited semiconductor source. The concentration of the radicals, and hence the degree of digestion, can be precisely tuned and is highly reproducible. The methodology can be integrated into microfluidic and HPLC systems for the analysis of single proteins or complex mixtures.

Modifications of the system may allow for the analysis of other biomolecules such as DNA and RNA.

Potential Applications

This technology is useful for protein characterization and identification based on the distinct fragmentation patterns observed. Modification to the technology may allow for fragmentation and characterization of nucleic acids as well as proteins.

Intellectual Property Status:

Patent Pending

Benefits and Advantages

- **Analytic –** Unique, reproducible digestion patterns can be obtained. Integration with microfluidics reduces sample requirements and limits chemical waste.
- **Hydroxyl RAC**
  - **User Friendly Platform** – There is no need for enzyme storage or titration. The integration of sample digestion with analysis reduces steps and improves reproducibility of analysis.
  - **Highly Tunable** - Cleavage parameters can be modified by increasing or decreasing hydroxyl radical production at the semiconductor surface.
  - **Clearer, Easier to Interpret Results** – No need for an added endopeptidase or other enzyme lowers cost, simplifies procedures and translates into results that are easier to interpret.

Contact

Jack Geltosky, PhD

Senior Vice President of Business Development,

Life Sciences

Arizona Technology Enterprises, LLC (AzTE)

P: 480.884.1989

F: 480.884.1984

JGELTOSKY@AZTE.COM