

Functionalized Modification of Polymer Fibers for HPLC (2012-094)

Functionalized Lipid Modification of Polymer Surfaces to Affect Chemical Reactivity and Sensitivity

Market Overview

These polymer fibers, used as stationary phases in high-performance liquid chromatography (HPLC), enable a high level of selectivity and throughput, thus increasing efficiency. Chromatography is a method used by scientists to separate organic and inorganic compounds for further analysis. Currently, over 60% of chemical analysis worldwide is done in conjunction with some form of chromatography. The global market for chromatography media was valued at \$372.3 million in 2018 and is expected to reach \$528.1 million by 2023. Because of the rising role of biopharmaceuticals, there is increasing need in the market for specialized phases to isolate specific proteins. This technology has the potential to fill this need in the market.

Technical Summary

This technology is used as the stationary phase in HPLC, featuring a novel polymeric fiber support that is modified with a series of bi-functional lipid molecules. The molecules are composed of anchoring “legs” which can be of varying hydrophobicity, from alkanes to polyethylene glycol chains. The functional head groups be customized to possess functional groups such as NH₃, COOH, or biotin. The lipids can be further modified with virtually an unlimited number of head groups, chosen such that the target species in the mobile phase can have varying degrees of affinity.

Application

Selective bioassays for high performance liquid chromatography

Development Stage

Functional Prototype

Advantages

- Customizable lipid head groups allowing for control of solute interacting in chromatography
- Micron-sized channels that span entire length of column allowing for faster flow rates and minimal backpressure
- High surface area on polymers, improving mass transfer

App Type	Country	Serial No.	Patent No.	CURF Ref. No.	Inventors
Utility	United States	14/333,561	US20150024511A1	2012-094	Dr. Richard Kenneth Marcus, Dr. Kenneth Christensen

About the Inventors



Dr. Kenneth Marcus

Professor of Chemistry at Clemson University

In 2010, Professor Marcus was named a Fellow of the Royal Society of Chemistry (FRSC), in 2012 a Fellow of the American Association for the Advancement of Science (AAAAS), in 2016 a Fellow of the Society for Applied Spectroscopy, and in 2018 a Fellow of the National Academy of Inventors. In 2019, Marcus was awarded the inaugural Clemson University Researcher of the Year designation. The development and application of new plasma techniques for the atomic spectroscopic analysis of diverse materials is a major focus of this research group. Included in this work is the design of atomic emission and mass spectrometry instrumentation employing glow discharge (GD) sources. Instrumentation developed in the Marcus laboratory is now commercially available from several manufacturers.

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