CHROMATOGRAPHIC COLUMN HAVING STATIONARY PHASE THICKNESS GRADIENT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 62/940,038, filed on November 25, 2019. The entire disclosure of the above application is incorporated herein by reference.

GOVERNMENT SUPPORT

[0002] This invention was made with government support under OH011082 awarded by the Centers of Diseases Control and FA8650-17-C-9106 awarded by the U.S. Air Force, Air Force Materiel Command. The government has certain rights in the invention.

FIELD

[0003] The present disclosure relates to gas chromatography devices including chromatographic columns having a stationary phase with a positive thickness gradient to enhance peak focusing.

BACKGROUND

[0004] This section provides background information related to the present disclosure which is not necessarily prior art.

[0005] Gas chromatography (GC) is an analytical method for separating gas phase compounds via separation columns, allowing for analysis and identification of compounds in a target sample. GC is widely used in many industries to separate and identify target analytes, such as volatile organic compounds or semi-volatile organic compounds. GC is particularly useful for analyzing complex samples having multiple target analytes that require individual detection. GC works by observing "peaks" of chemicals passing through a separation column. Thus, a sample having different chemicals or target analytes is introduced via an injector into a column. The column comprises a material inside that is considered a stationary phase. Different portions of the sample pass through the column at different rates (due to each chemical's physical and chemical interactions with the material contained in the column). As the target analytes are eluted from and exit the column, a detector can differentiate the species eluted over time based on the rate at which the analytes pass through the column. Such analytes can be electronically identified and/or quantified during or after the detection. It is desirable to improve separation within a chromatographic column to enhance performance and GC detection capability.