



REVIEW

Thin-Layer Chromatography–Flame Ionization Detection

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Abstract

Thin layer chromatography–flame ionization detection (TLC–FID) is a versatile analytical technique that can be used for fast analysis of organic compounds. It has been implemented in past decades for the analysis of lipids and petrochemical products, but rarely in other fields. Despite the improvement in the latest Iatroscan model and the introduction of an automatic programmable sample spotter, this system is still struggling to gain acceptance in universities and major research laboratories. The reason behind this might be a lack of awareness on the potential application of this system to other fields of analytical chemistry. This review presents TLC–FID as a mature and reliable, state of the art technique that combines the separation power of TLC with FID as a universal detector, which can be applied to the analysis of a wide variety of organic compounds. Basic operational procedures and previous literature, including its potential for ultrafast analysis of commercial samples, are discussed in order to create awareness on the potentials of this piece of equipment to other fields.

Keywords TLC–FID · Iatroscan · Lipids · Petrochemicals · Chromarods

Introduction

Thin-layer chromatography–flame ionization detection (TLC–FID) is a unique system that combines the advantages of FID as a universal detector and the separation capability of TLC to make it a powerful analytical separation technique that can be used for a wide range of component analyses. The introduction of FID as a direct-detection mode for TLC for fast analysis of compounds is a significant improvement over conventional TLC, as it provides both qualitative and quantitative information without any need for the laborious use of a visualization agent. The system is now being marketed as Iatroscan TLC–FID. It has the advantage of analyzing compounds with low volatility as compared to

conventional GC. Compounds without chromophore can effectively be detected by this equipment without any need for chemical derivatization. The principle of separation is the same as that of classical TLC, but its stationary phase is made up of quartz rods (chromarods) exclusively designed for Iatroscan TLC–FID equipment. It is a simple and flexible analytical setup that can easily be adapted to handle difficult matrices.

The concept of using FID as an alternative detector for TLC was first introduced by Padley [1] from Unilever research laboratories in the late 1960s. He used a flame ionization detector and amplifier taken from a gas chromatograph for the analysis of lipids after separation on self-made thin silica glass rods. A relative standard deviation of 1.22% for a standard mixture of cholesterol, methyl palmitate and triolein was reported at that time. Okumura et al. [2] later developed reusable silica gel sintered glass ceramic sticks called chromarods for TLC–FID, which gave birth to what is known today as Iatroscan TLC–FID, after Iatron laboratories obtained the license to manufacture the equipment. This initial work reported the qualitative analysis of various classes of organic compounds after separation on chromarods. This technique was then seen to have potential over a wide range of applications in the field of clinical, biological, medicinal, pharmaceutical and synthetic chemistry, but the non-reproducibility of values and the uncertainty

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Thin Layer Chromatography With Flame Ionization Detection

M. Ranny

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Thin Layer Chromatography With Flame Ionization Detection:

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compares modern TLC with other separation methods contains extensive coverage of sample preparation methods surveys the latest instrumentation for high performance and overpressured TLC covers current principles and techniques and more

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Modeling Magnetospheric Plasma Processes David C. Hurd,Gordon R. Wilson,Derek W. Spencer,American Geophysical Union,1991-01-08 Published by the American Geophysical Union as part of the Geophysical Monograph Series Volume 62 The ultimate goal of modeling of the plasma in Earth s environment is an understanding of the magnetosphere and ionosphere as a coupled global system To achieve this goal requires a coordinated effort between models applied to different spatial scales The desire to model this system on a global scale is leading to models which encompass larger and larger regions The ever increasing availability of computing resources has allowed models to expand to 2 and 3 dimensions At the other extreme are the micro scale processes which transfer energy to individual particles within the global system As more detailed observations become available the necessity for accurately including such processes in the global models becomes more apparent Then it becomes a question of how to incorporate the necessary physical processes from all scale sizes into a model of a global system It now seems clear that such multi scale scenarios exist where micro scale processes provide energy to the plasma which flows outward from Earth into the distant magnetotail before returning to the near Earth regions The challenge of incorporating all relevant processes into a model of this entire plasma path is a formidable one The existence of separate models of the separate steps along this pathway leads directly to efforts to fuse models with different scales into a single self consistent treatment **Toxicological Profile for Carbon Disulfide** ,1996 **Handbook Of Thin-Layer**

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