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A comprehensive two-dimensional gas chromatography Valve Modulation Method Using Hold-Release Primary Column Flow for Long Secondary Separation Time with 100% Transfer

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Highlights

- A new GCxGC valve modulation method has been proposed and tested.
- The method can achieve long secondary dimension duration time up to 60 seconds.
- A long secondary column up to 30m is possible by using this method.
- Gasoline and Diesel samples have been tested with this method.

Abstract

A valve modulator with a hold-release primary column flow method has been proposed. This method uses a valve plumbed so that the head and tail of the primary column are connected during the secondary separation, to reverse, slow down, and finally stop the primary column flow. This keeps the sample in the primary column longer, gaining more time for secondary separation. Applying this method, a 60-second secondary retention time with 100% transfer, 133ms secondary peak width at base, and no primary peak profile loss has been achieved. A standard sample with 19 compounds in 3 groups has been tested. The relative standard deviations for the retention time of this standard mixture are <0.26% for primary dimension and

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