COMMUNICATION

Chromatographic application of Fullerene Compounds on Poly(4-methyl-5- vinylthiazole) Stationary Phase

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ABSTRACT: The poly (4-methyl-5-vinylthiazole) stationary phase can be used HPLC chromatographic separation for C60 and C70 Fullerene compounds under normal phase. In comparison to commercial Diol-Phase, poly(4-methyl-5-vinylthiazole) stationary phase can provide better separation of C60 and C70.

Key words：Fullerene, poly (4-methyl-5-vinylthiazole) stationary phase

INTRODUCTION

C60 and C70 Fullerene compounds were originally found in 1996 by Kroto, Smalley and Curl [1]. The separation of these compounds studied by Ajie [2] and Howard [3] revealed RP-18 column in HPLC is not in efficient. However, Den proposed Sock-Ball chromatographic mechanism to synthesize five different sock-stationary phases for separation of C60 and C70 Fullerene compounds in carbon soot [4~6] can obtain good approach. I proposed a poly (4-methyl-5- vinylthiazole) stationary phase with coupling agentγ- Methacryloxypropyl trimethoxysilane in which one side connecting with silica jel and another side with 4-methyl-5-vinylthiazole. Not only the proposed phase has the characteristics of stationary, it also can be used in reverse phase. In comparison to RP-18 [7], poly (4-methyl-5-vinyl thiazole) can even function better.

MATERIALS AND METHODS

C60 and C70 were bought from STREM. RunningHPLC to get separation of C60 and C70 include using Waters 600E, Waters U6k Injector, Waters Lambda Max LC, Spectrophotometer model 481 and SISC Chromatography Data System. All Injector Columns were operated in 25℃. The column size is 4.6mm I.D. × 250mm made in Japan G. L. Science. Diol-Phase column was made in USA.

RESULTS

Poly (4-methyl-5-vinylthiazole) stationary phase column can provide better separation of C60 and C70. Table I shows the K (Capacity Factor K value) values for mobile phase under the condition of n-hexane / dichloromethane(80:20). The separations of C60 and C70 were depicted in Figure 1 and Figure 2.

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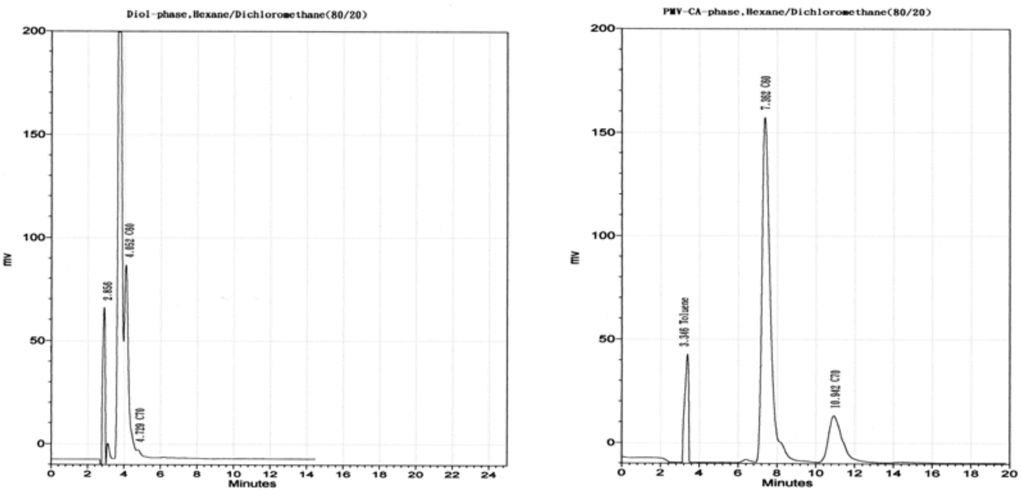

Figure 1. The Chromatography of C60,C70 on Diol-Phase and PMV-Phase
(Mobile Phase: n-Hexane/Dicholoromethane 80/20)

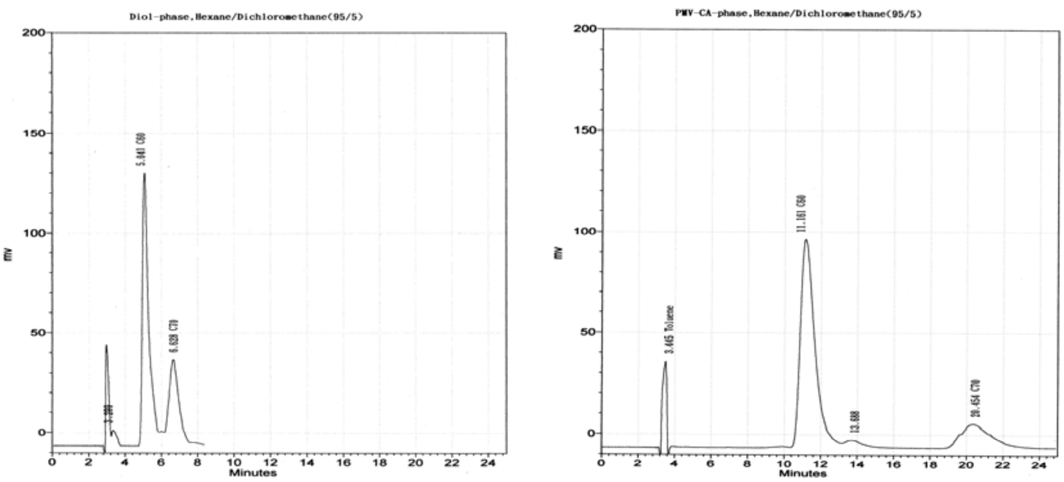

Figure 2. The Chromatography of C60,C70 on Diol-Phase and PMV-Phase
(Mobile Phase: n-Hexane/Dicholoromethane 95/5)

Table I

Capacity Factor K values for Diol-phase and PMV-phase in 80/20 and 95/5 Hexane/Dichloromethane Mobile Phase for C60 and C70

sample	Diol-phase Hexane/Dichloromethane 80/20 K_1	Diol-phase Hexane/Dichloromethane 95/5 K_2	PMV-phase Hexane/Dichloromethane 80/20 K_1	PMV-phase Hexane/Dichloromethane 95/5 K_2
C_{60}	0.4187	0.575	1.200	2.240
C_{70}	0.6558	1.071	2.270	4.937