

Solid phase extraction using new Polar Magic Chemisorber®

6. Analysis of air inside a new car

[Background] Volatile organic compounds are collected from the indoor air in a new car by active (pumped) sampling using a new Magic Chemisorber® MC-PEG, and analyzed by thermal desorption (TD)-GC/MS.

[Experimental] A Polar Magic Chemisorber® MC-PEG (film thickness of PEG: 30 µm, volume: 3.8 µL) was placed in the inlet tube of a small air pump which was put inside a new car, and the pump was operated at 0.5 L/min for 24 h at 20-35 °C. The Magic Chemisorber® was then put in a deactivated sample cup and TD-GC/MS measurement was carried out by a Multi-Shot pyrolyzer (EGA/PY-3030D Frontier Labs) interfaced to a GC/MS injection port. The furnace temperature was programmed from 100 °C to 230 °C (3 min hold) at 20 °C/min for thermal desorption. Thermally desorbed compounds were swept by the helium carrier gas to the GC injection port. The desorbed compounds were once cryo-trapped at the head of the GC column (UA-WAX) using a MicroJet Cryo-Trap, prior to chromatographic separation and detection by a mass detector. For comparison, the analysis was similarly performed using the nonpolar Magic Chemisorber® MC-S500.

[Results] Chromatograms of the extracted compounds from the air inside the car are shown in Fig. 1, and peak assignments are summarized in Table 1. Various polar compounds such as phenol and an oxidized product of BHT, were observed in the chromatogram. The results show that the use of the Magic Chemisorber® MC-PEG and the pyrolyzer configured for thermal desorption is a quick and simple technique for analyzing polar compounds in air samples.

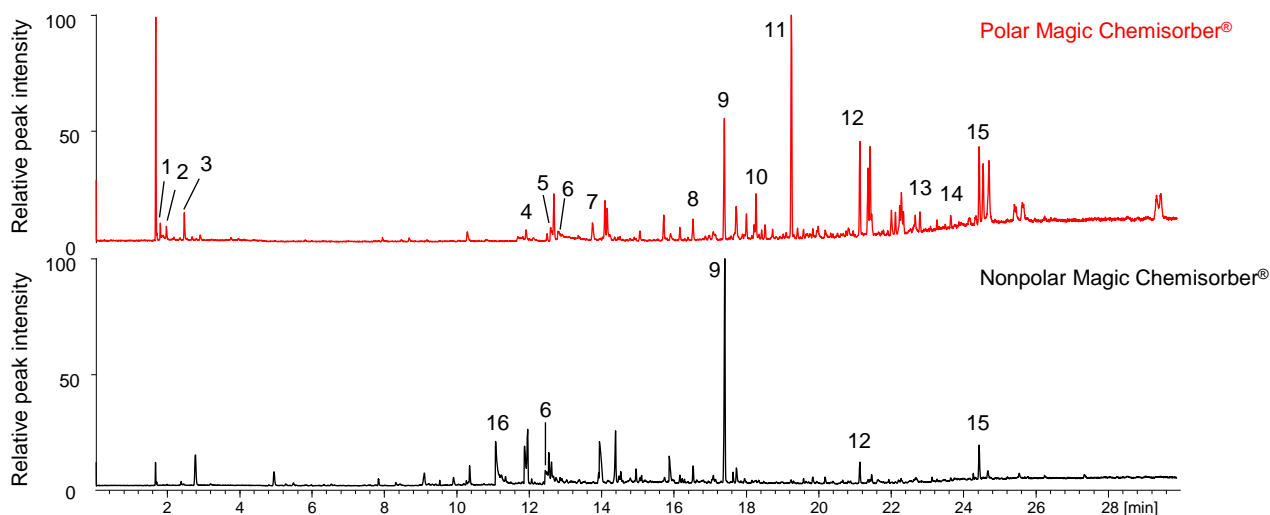


Fig. 1 Chromatograms of extracted compounds from the air inside the new car by polar and nonpolar Magic Chemisorber®

Sample: air inside a new car, Sampling: held in the air stream of an air pump (0.5 L/min) for 24 h at 20-35 °C

Thermal desorption temp.: 100 - 230 °C (40 °C/min, 3 min hold), cryo-trapped with MicroJet Cryo-Trap

Separation column: Ultra ALLOY-WAX (polyethylene glycol), L = 30 m, i.d. = 0.25 mm, df = 0.25 µm

Column flow rate: 1 mL/min, Split ratio: 1/5, GC oven temp.: 40 °C (3 min hold) - 250 °C (10 °C/min, 14 min hold)

Table 1 Compounds extracted from air inside the new car (compounds extracted only by polar Magic Chemisorber® are shown in red)

#	Compound	#	Compound	#	Compound
1	Formaldehyde	8	4-Oxaheptane-2,6-diol	13	3,5-Di- <i>tert</i> -butyl-4-hydroxy benzaldehyde (BHT-CHO)
2	Acetaldehyde	9	Dibutylhydroxytoluene (BHT)	14	<i>p</i> - <i>tert</i> -Octylphenol
3	Acetone	10	Phenol	15	Tris(1-chloro-2-propyl) phosphate (TCPP)
4	Acetic acid	11	2,6-di- <i>tert</i> -butyl-4-hydroxy -4-methylcyclohexa-2,5-dienone (BHT-OH)	16	Bis(2-(dimethylamino)ethyl) ether
5	Formic acid	12	2,4-Di- <i>tert</i> -butylphenol		
6	1,4-diazabicyclo[2.2.2]octane (DABCO)				
7	Propylene glycol				

Keywords : Solid phase extraction, Polar sorbent, PEG, TD-GC/MS, Air inside a new car

Products used : Multi-functional pyrolyzer, Magic Chemisorber® MC-PEG, MC-S500, MicroJet Cryo-Trap, UA-WAX

Applications : Environmental analysis

Related technical notes : [MCA-011E](#), [MCA-012E](#)

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