

# Solid phase extraction using non-polar and polar Magic Chemisorber®

## 3. Headspace analysis of rubber band volatile components

**[Background]** In the solid phase extraction (SPE), various polymeric stationary phases have been used to extract analytes from aqueous and gaseous samples. Thus, it is interesting to see the differences in extraction behavior with different stationary phases. Here, headspace solid phase extraction (HS-SPE) using non-polar Magic Chemisorber® MC-S500 and polar Magic Chemisorber® MC-PEG-S is described for the analysis of volatile components in natural rubber band.

**[Experimental]** A non-polar Magic Chemisorber® MC-S500 (film thickness of PDMS: 500 µm) was attached to an Eco-Stick DF and held in the headspace of a 17 mL vial containing 0.20 g of commercially obtained rubber band (No.16) at 80 °C for 10 min. The Magic Chemisorber® was then set in the pyrolyzer furnace and heated: 100 - 230 °C (3 min hold). Thermally desorbed compounds were swept by a helium carrier gas to a GC separation column (UA-WAX) and cryo-trapped at the head of the separation column using a MicroJet Cryo-Trap. Then, the trap was turned off, and the released volatiles were separated and detected by a quadrupole mass detector. For comparison, the analysis was similarly performed using the polar Magic Chemisorber® MC-PEG.

**[Results]** Chromatograms of the extracted compounds from the rubber band are shown in Fig. 1, and peak assignments are summarized in Table 1. Non-polar Magic Chemisorber® mainly extracted aliphatic hydrocarbons (1-7) and benzothiazole (8). On the other hand, using the polar Magic Chemisorber®, the peak intensities of aliphatic hydrocarbons (4-7) were lower than those obtained when using the non-polar MC. As described above, it was demonstrated that volatile components in rubber band can be analyzed easily and quickly using solid-phase extraction with Magic Chemisorber®, followed by thermal desorption GC/MS with a pyrolyzer.

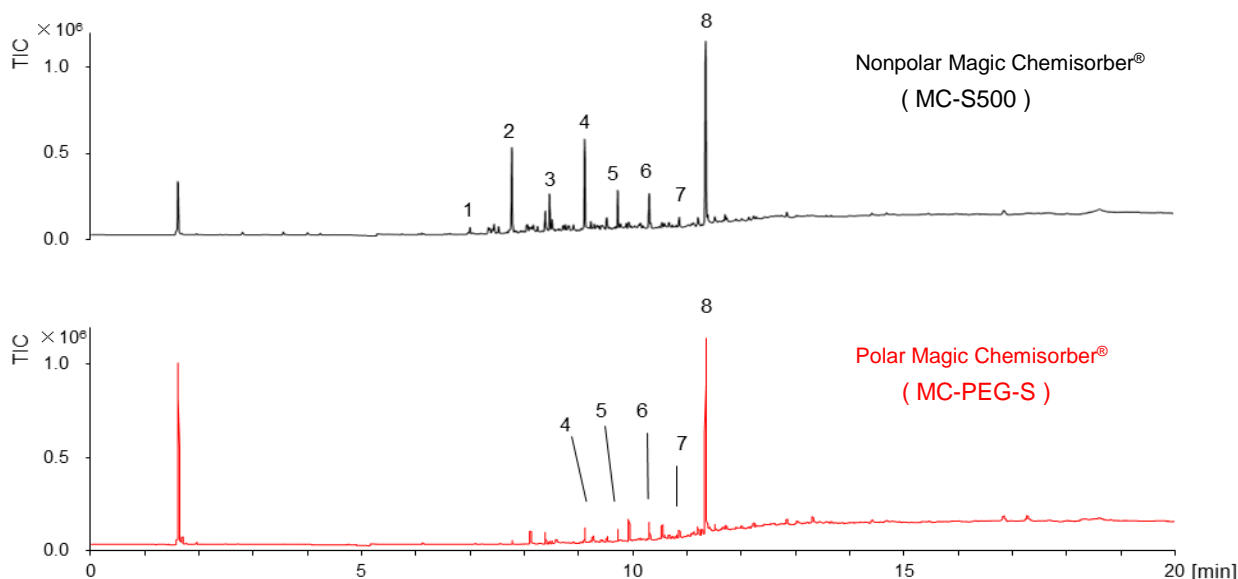


Fig. 1 Chromatograms of components extracted from rubber band by polar and nonpolar Magic Chemisorber®

Sample amount: 0.20 g, Headspace extraction: 10 min at 80 °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: 1/10, GC oven temp.: 40 °C (2 min hold) - 230 °C (20 °C/min, 8.5 min hold)

Table 1 Compounds extracted from rubber band

#	Compound	#	Compound	#	Compound
1	Tridecane	4	Hexadecane	7	Nonadecane
2	Tetradecane	5	Heptadecane	8	Benzothiazole
3	Pentadecane	6	Octadecane		

**Keywords :** Evolved gas analysis, Solid-phase extraction device, Thermal desorption GC/MS, Natural rubber

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

**Applications :** Various industries, General polymer analysis, additives analysis

**Related technical notes :** [MCA-020E](#), [MCA-021E](#)

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