

Application Note Environment

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Almost every product or material used in the interior of a building produces some sort of outgassing. These products include carpet, tile, adhesives, paints, wallcovering, window shades, and so on. These emissions are referred to as VOC's or Volatile Organic Compounds, and some of these can be harmful to human health. Due to these health risks, indoor air quality standards have been developed.

According to the Carpet and Rug Institute, VOC's of interest in new carpeting include 4-PCH (4-Phenylcyclohexene) the so called "new carpet smell" as well as vinyl acetate, styrene, dodecanol, and acetaldehyde.

Thermal desorption involves trapping volatiles onto a suitable sorbent (like Tenax) tube and analyzing by GC or GC/MS. A sample of carpet (7.5 cm x 7.5 cm) was placed into an 800 mL sealed dynamic headspace vessel, which was purged with a flow of Helium. An exterior vent port containing a Tenax sampling tube collected carpet volatiles purged over a period of one hour. The sampling tube was desorbed using an autosampler interfaced to a Dynatherm 9300 containing a Tenax focussing trap. The focussing trap was desorbed to the GC/MS.

Figure 1 shows carpet volatiles collected after one hour. They include styrene (1), 4-PCH (2), and dodecanol (3). Figure 2 shows carpet standard volatile compound linearities using spiked sample tubes of various concentrations.

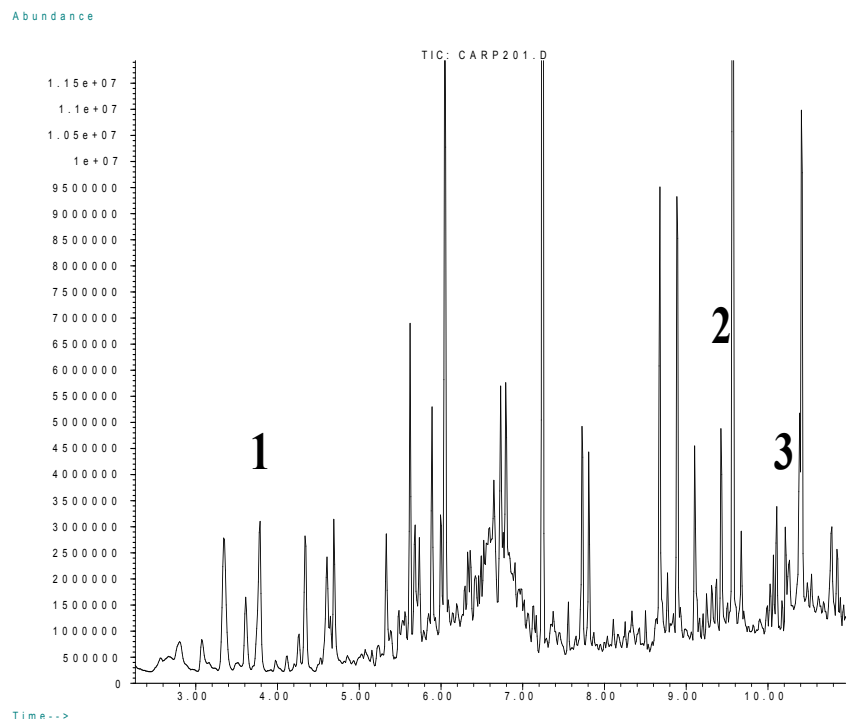


Figure 1. Carpet Volatiles

CDS 800mL DHS Vessel

Purge Flow: Helium, 50mL/min
Purge Time: 1 hour

CDS Autosampler Dynatherm 9300

Valve Oven: 300°C
Transfer Line: 260°C
Tube Heat: 350°C 7 minutes
Trap Heat: 300°C 7 minutes

GC/MS

Column: HP-5MS
(30m x 0.25mm x .25µm)
Carrier: Helium, 50:1 split
Injector: 300°C
Program: 40°C/2min, 15°C/min to 210°C

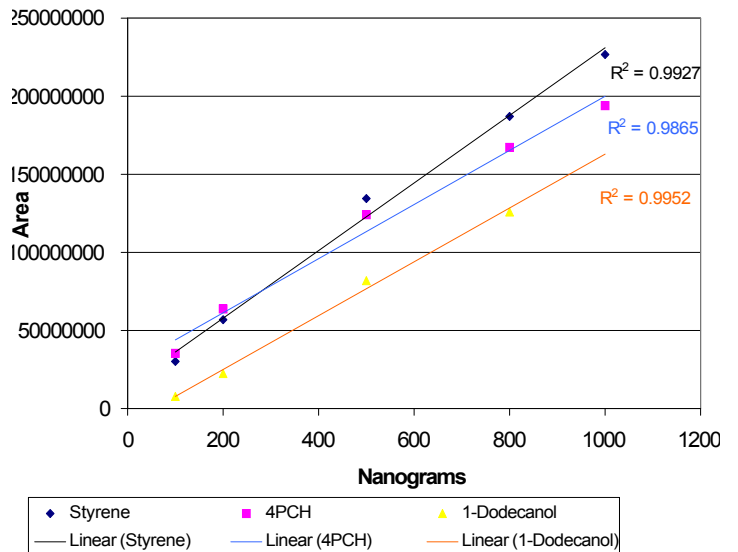


Figure 2. Carpet volatiles linearity.

Carpet Volatile Reproducibility of 4-Phenylcyclohexene

15 Individual Station Runs of 200ng/µl
Spike of 4-PCH:

Average Area Count: 4.25 x 10⁷
Standard Deviation: 8 x 10⁴
% Relative Standard Deviation: 1.87

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