



Dynamic Headspace of Polycarbonate for Organic Acids

Application Note

Environment

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Solid materials, such as synthetic polymers, may be sampled for residual organic compounds using thermal techniques to volatilize the analytes without the need for solvent extraction. In this example, polycarbonates are assayed for the presence of organic acid impurities using dynamic headspace and a CDS Autosampler. Polycarbonates were purged to a sorbent trap, then desorbed to a GC/MS for identification.

An acid standard was run at 50°C for 20 minutes to establish retention times and peak identification (see Figure 1), and blanks were run to establish a clear baseline. Polycarbonate samples (~100mg) were added to a headspace vessel; different headspace desorption temperatures were tried and it was found that the trace acids in the polymer matrix were released efficiently at 100°C for 20 minutes. Figure 2 shows a portion of the standard chromatogram (peak numbers keyed to the Figure 1 Chromatogram) overlaid with the compounds desorbed from a polymer sample. All of the acids present in the standard acid mix were observed in the polymer sample.

Instrument Conditions

CDS DHS Vessel

Purge Temp: 100°C
Purge Flow: He, 50mL/min
Purge Time: 20 minutes

CDS Autosampler Dynatherm 9300

Valve Oven: 200°C
Transfer Line: 200°C
Tube Heat: 300°C 5 minutes
Trap Heat: 300°C 5 minutes

GC/MS

Column: Stabilwax (30m x 0.25mm x 0.5µm)
Carrier: Helium, 20:1 split
Injector: 250°C
Program: 60°C/2min, 12°C/min to 250°C

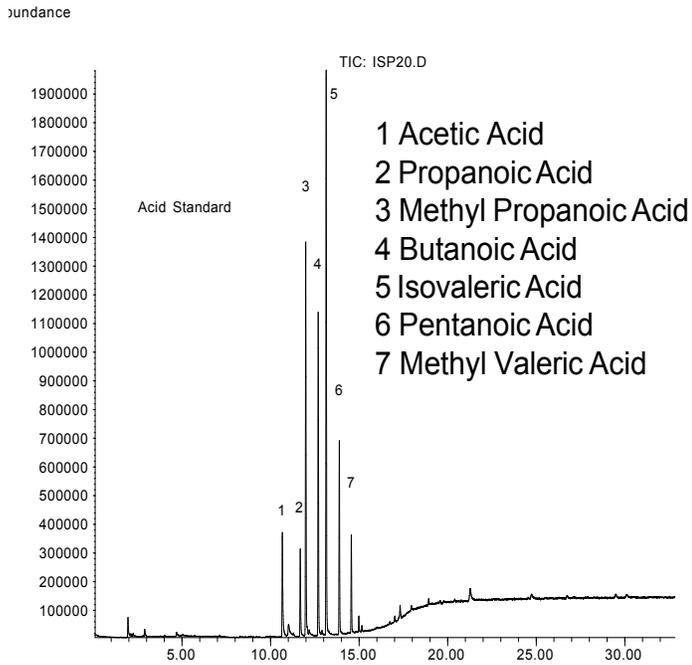


Figure 1. Acid Standard

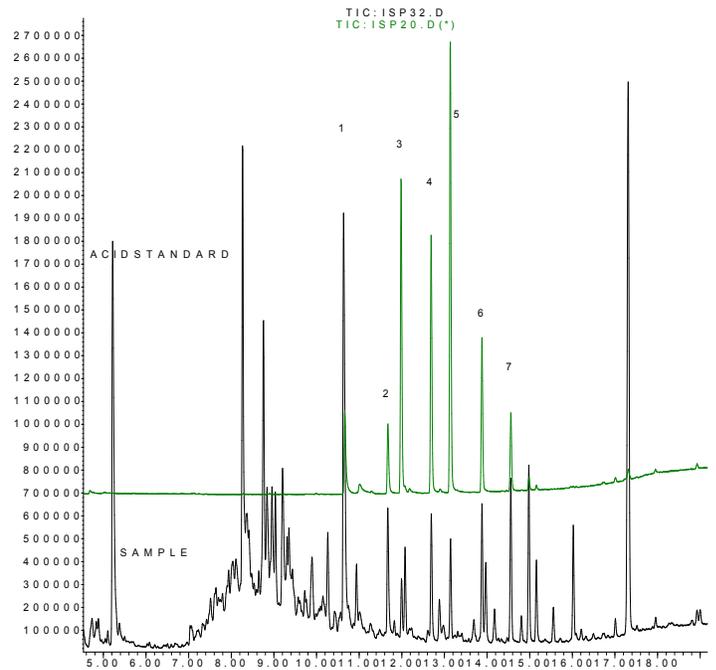


Figure 2. Acid Standards (top, green) overlaid with polycarbonate (bottom, black)