

Analysis of Cosmetics by Pyrolysis-GC/MS

Application Note

Cosmetics

Author:

T. Wampler

Cosmetics include a diverse group of products such as lipsticks, mascara, eye-shadow, moisturizers, foundations, and many other specialty products. Their formulations are extremely complex, consisting of a myriad of components. The list of ingredients runs the gamut from alcohol as a solvent to methyl paraben used as a broad spectrum antimicrobial. Many formulations contain both organic and inorganic pigments.

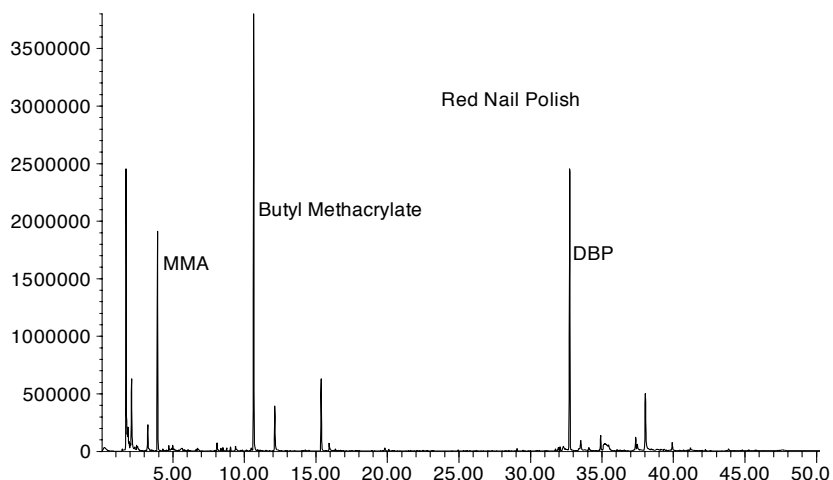
Traditional component analyses require large sample amounts as well as tedious solvent extractions. Pyrolysis-GC/MS is a viable alternative to these methods. Pyrolysis is defined as the use of thermal energy only to effect chemical degradation. The CDS Pyroprobe Autosampler interfaced to a GC/MS enables small samples to be pyrolysed and analysed efficiently with minimal preparation.

Figure 1 shows a chromatogram of a typical nail polish containing the monomers methyl methacrylate (MMA) and butyl methacrylate. The peak at about thirty three minutes is dibutyl phthalate, a plasticiser (DBP) and is used to give the nail polish polymers flexibility and to help prevent chipping.

Figure 2 is a chromatogram of a liquid eye liner. Note the pyrrolidinone peak which is the carrier liquid in the eye liner. The high molecular weight aliphatic hydrocarbons are used to make the liner less impervious to water.

These two chromatograms of cosmetic products clearly illustrate the analytical power of thermally treating samples. The versatility of thermal sample preparation easily lends itself to de formulation work in R&D, as well quality assurance for production.

abundance



ime-->

Figure 1. Nail Polish

Instrument Conditions

Pyroprobe Autosampler

Pyrolysis: 700°C 15s

Valve Oven: 300°C

Sample size: 25-50 micrograms

GC/MS

Column: 5% phenyl (30m x 0.25mm x .25µm)

Carrier: Helium, 75:1 split

Injector: 300°C

Oven: 40°C for 2 minutes

6°C/min to 295°C hold 10 min

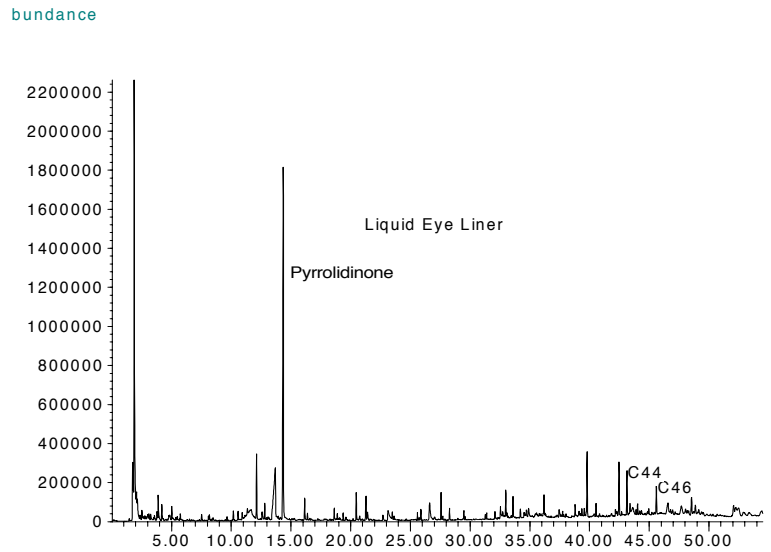


Figure 2. Liquid Eye Liner

FOR MORE INFORMATION CONCERNING THIS APPLICATION,
WE RECOMMEND THE FOLLOWING READING:

P. Bore, Cosmetic Analysis, Marcel Dekker, New York, 1985

A. Senzel, Newburgers Manual of Cosmetic Analysis, AOAC International, Maryland, 1977