Abstract:
A new vertical microfurnace-type pyrolyzer for thermal desorption and/or pyrolysis-gas chromatography has been developed. The pyrolyzer consists of two independent temperature-controlled ovens.

Initially, in the desorption process, a sample cup containing the polymeric sample of interest is inserted into an oven at 300°C; the sample is then re-positioned at the upper part of the pyrolyzer where the temperature is maintained at room temperature. The resulting vaporized components such as residual solvents and additives give a desorption chromatogram. The relative peak intensities of desorbed plasticizers in acrylonitrile butadiene-rubber gave a relative standard deviation (RSD) of less than 2%.

Subsequently, pyrolysis of the remaining polymer is conducted by dropping the sample cup into the second, pyrolyzing, oven at 55°C; at this stage the pyrogram is recorded.

The resulting two chromatograms of desorbed components and pyrolysis products make it easier to characterize the polymer formulation than the complicated pyrogram obtained by an ordinary, single-step pyrolysis.

Frontier Labs products used:
Multi-functional Pyrolyzer prototype