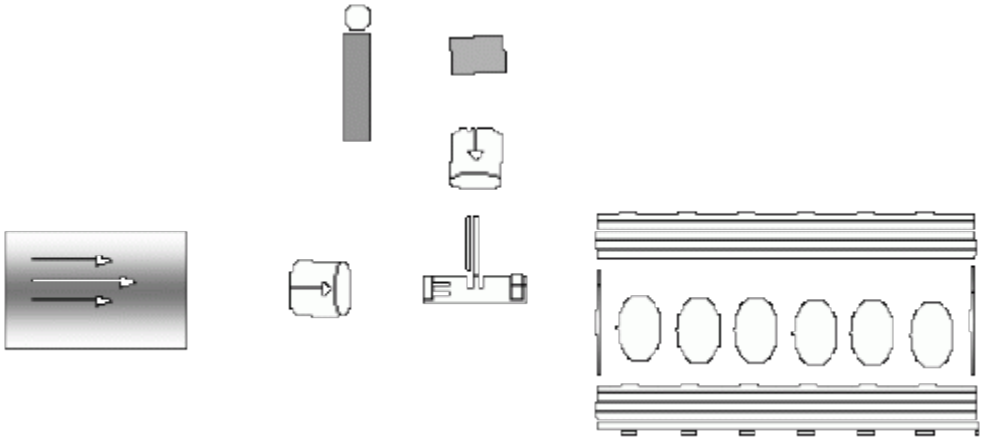
High performance stationary phases, which provide high resolutions and are stable at high temperatures, are of significant importance in gas chromatographic analysis. Carbon nanotubes are nano-sized carbon-based sorbents, which have high surface area, large aspect ratio and are known to be stable at high temperatures. Therefore gas chromatography can benefit from their unique properties. Gas chromatography separations in an open tubular format on self-assembled single walled carbon nanotubes (SWNTs) is being performed with an average thickness of 300 nm, which is self-assembled by a unique single-step, catalytic chemical vapor deposition (CVD) process consisting of dissolved cobalt and molybdenum salts in ethanol.

A variety of organic compounds with varying polarity can separated at high resolution and the column efficiency demonstrated around 1000 theoretical plates/m. The range of compounds that can be separated by GC on sa single column ranges from small molecules like methane to large molecules like PAHs. Figure 1 shows a separation range from C1 to C14 hydrocarbons. This extremely wide range is attributed to high capacity adsorption followed by relatively easy and fast desorption from the high aspect ratio CNTs. This is truly a nano-effect of these ultra small sorbents.

Comparison of capacity factors (k') and isosteric heats of adsorption (DHs) with a packed column containing a commercial sorbent (Carbopack CTM) showed comparable results. This demonstrated high capacity and strong sorbate-sorbent interactions on the SWNT phase. Evaluation of the McReynolds constants suggested that the SWNT was a non-polar phase.



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