☐ *Stationary Phase Selectivity*

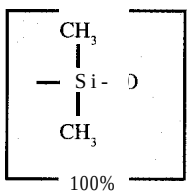
When purchasing a new column, the most important consideration is the stationary phase. There are many different interactions that occur between the analytes and the functional groups of the stationary phase. These interactions contribute more to the overall results of the analysis than any other factor in the column. That is why it is important to understand as much about your column and sample as possible.

Table I shows the chemical structure of most common stationary phases. Changes in selectivity can be observed by using a column with different functional groups as well as increasing the percentage of substitution of those functional groups. The non-polar Rtx-1 phase will preferentially retain non-polar compounds compared to polar compounds such as alcohols. As non-polar methyl units are substituted with polar functionalities such as phenyl and cyanopropyl units, the selectivity of the column shifts towards more polar compounds. In turn, non-polar compounds are retained less as there are less overall methyl units for the non-polar compounds to interact with. The Rtx-200 stationary phase contains triflouropropyl units which provide high selectivity for analytes containing lone pair electrons, such as nitro and carbonyl groups. Polyethylene glycol columns, such as Stabilwax and Rtx/MXT-WAX, are polar and are highly selctive towards polar compounds such as alcohols.

☐ *Table 2*

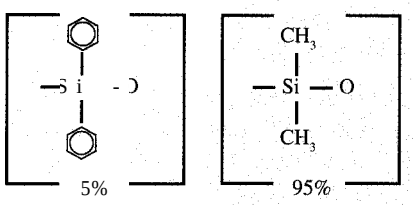
Comparison of structures, polarities, properties, and uses for each capillary column phase listed in order of increasing polarity.

Rtx/MXT-1
100% dimethyl polysiloxane



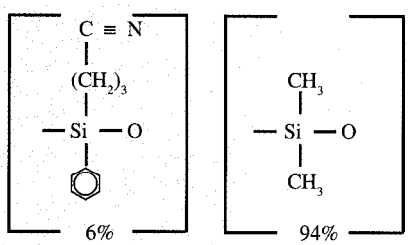
Polarity: *non-polar*
Uses: *solvents, petroleum products, pharmaceutical samples, waxes*

Rtx/MXT/XTI-5
5% diphenyl - 95% dimethyl polysiloxane



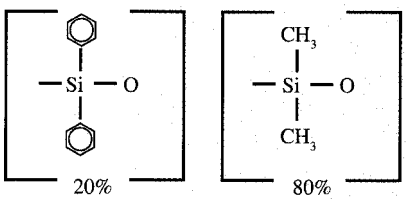
Polarity: *non-polar*
Uses: *flavors, environmental samples, aromatic hydrocarbons*

Rtx/MXT-1301, Rtx/MXT-624
6% cyanopropylphenyl
94% dimethyl polysiloxane



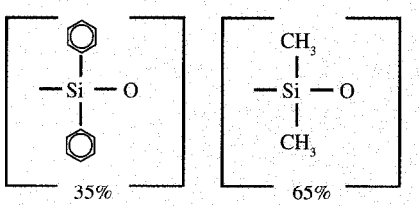
Polarity: *slightly polar*
Uses: *volatile compounds, insecticides, residue solvents in pharmaceutical products*

Rtx/MXT-20
20% diphenyl - 80% dimethyl polysiloxane



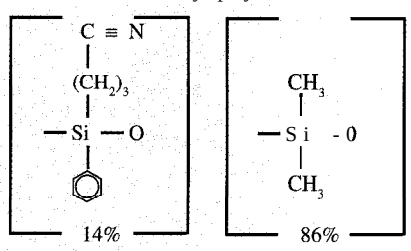
Polarity: *slightly polar*
Uses: *volatile compounds, alcohols*

Rtx/MXT-35
35% diphenyl - 65% dimethy polysiloxane



Polarity: *intermediately polar*
Uses: *pesticides, Aroclors, amines, nitrogen containing herbicides*

Rtx/MXT-1701
14% cyanopropylphenyl
86% dimethyl polysiloxane



Polarity: *intermediately polar*
Uses: *pesticides, Aroclors, alcohols oxygenates*

Table I (cont.) *Table I, listing column phase structures, is continued on page 38.*