Another important equation in chromatographic separations is the fundamental resolution equation. The equation relates the resolution of two compounds ($R_S$) to the number of theoretical plates (N), retention or capacity factor ($k'$), and selectivity factor ($\alpha$). Appendix I shows the derivation of the fundamental resolution equation. Since we would usually be interested in separating two compounds that are close to each other in a chromatogram, and therefore possibly not resolved, we usually think of applying this equation when we want to improve the resolution of two adjacent components.

$$R_S = \left(\frac{\sqrt{N}}{4}\right)\left(\frac{\alpha - 1}{\alpha}\right)\left(\frac{k_2'}{1+k_2'}\right)$$

The interesting part about this equation is that it is possible to examine a chromatogram with poor resolution, decide which of the three terms is causing the most serious problem, and then make systematic experimental changes to improve the results. It is worth examining the types of experimental changes that can be made to influence each of these terms. Notice that in each case, making the term larger will improve the resolution.

- Topic hierarchy