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A study of the analysis of acidic solutes by hydrophilic interaction chromatography.

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### Highlights

- Selectivity of amine and amide stationary phases for acids studied in HILIC.
- On both columns, retention of strong acids decreases with increasing pH.
- Retention of weak acids increases on both, but can decrease at high pH.
- Acid charge, together with silanol effects, influence this behaviour.
- Increased hydrogen bonding of acids at high pH may occur on the amide phase.

### Abstract

The analysis of acidic solutes was compared on a cross-linked bonded amino phase and a neutral hybrid inorganic-organic amide phase, previously shown to give reasonable retention of acidic solutes. The amino column gave strong selective retention of acids, which was governed by ionic interactions that mostly increased as the solute became more negatively charged at higher pH. While the relative selectivity of the amide column towards acids, bases and neutrals was completely different to that of the amino column, the selectivity of both columns towards acidic solutes alone was surprisingly similar. It is possible that solute charge also controls retention on the amide column, through increased solute hydrophilicity and increased hydrogen bonding between the ionised form of the acid and neutral polar column groups. On both these silica-based columns there appeared to be a competitive effect between repulsion of acidic solutes from silanols, which become increasingly ionised as the pH is raised. This effect was absent when using a polymer-based amino phase which has no silanols.

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