Why Zirconia? - Bigger Method Development Toolbox

**Zirconia Phases**

**Zirconia Surface Chemistry**

- Weak Brønsted Acid: Zr–OH
- Weak Brønsted Base: Zr(OH)₂

**Choosing Buffer Type & Concentration on Selectivity of Zirconia-PBD**

- **Effect of Buffer Type & Concentration on Selectivity of Zirconia-PBD**

**Effect of pH on Selectivity of Zirconia-PBD**

- 1. RH₂ + H⁺ ↔ RHNH₂
- 2. RHNH₂ + H⁺ ↔ RHNH₃⁺

**Separation**

- Analyte Charge
- Buffer Charge
- Separation Mode

**High pH Stability Comparison**

- Stability Over a Wide Range of pH (1-14)

**Elevated Temperature Enables Fast Separation Without Switching Columns or Losing Resolution**

1. **Condition:** Mobile Phase, 275/72.5 ACN/50 mM Tetramethylammonium hydroxide, pH 12.2; Flow Rate, 1.50 ml/min.; Injection Volume, 0.50 µl; 254 nm detection; Column Temperature, 21°C; Pressure drop = 195 bar; Solutes: 1 = Doxylamine, 2 = Methapyrilene, 3 = Chlorpheniramine, 4 = Triprolidine, 5 = Meclizine

**Conclusions**

- Zirconia reversed phases, such as ZirChrom®-PBD & CARB offer excellent chemical and thermal stability:
- Faster separations at high temperatures:
- Better selectivity of ZirChrom®-CARB for structurally similar compounds.