

Ion Selective Electrodes. Interference and Selectivity

No ISE is perfectly selective. Even the pH electrode suffers interference from Sodium in high pH solutions. Below is a table of selectivity coefficients which will help you decide whether or not your analysis is being compromised by the presence of other ions that you are not wishing to measure.

The Selectivity Coefficient quantifies the is the apparent increase in the measured concentration caused by 1 unit of the interferent.

Multiply the SC by 100 to give the % error when analyte and interferent are the same concentration.

Ammonium	Potassium (0.1), Sodium (0.002), Magnesium (0.0002), Calcium (0.00006), Lithium (0.00003).
Bromide	Chloride (0.002), Hydroxyl (0.00003). Silver, Cyanide, Sulphide and Iodide must be absent.
Cadmium	Iron (10) or Lead (10) these should be less than 1 /100th of the Cadmium conc. Silver, Sulphide, copper and Mercury must be absent.
Calcium	Iron Fe+2 (0.02) Strontium (0.008), Barium (0.005) Copper (0.002), Sodium, (0.0005), Mg (0.0006), K (0.00005), NH ₄ (0.00003), Lithium (0.00001), Al +3 (5) Only tolerated in low concentrations.
Chloride	Iodide, Bromide, Cyanide, Sulphide, Silver must be absent, or only present in insignificant amounts compared to the Chloride ion.
Copper	Bromide (>1), Chloride (>1). Silver, Sulphide and Mercury must be absent.
Cyanide	Silver, Sulphide and Iodide should not be present
Fluoride	Hydroxyl (0.1)
Iodide	Bromide (0.0004), Chloride (0.000001). Silver Sulphide and Iodide should be absent.
Lead	Cadmium (>1) . Silver Sulphide, Copper, Iron II, Iron III and Mercury Should be absent.
Mercury	Silver and Sulphide must be absent
Nitrate	Chloride (0.006) Bicarbonate (0.005), Nitrite (0.001), Acetate (0.0005), Fluoride (0.0001), Sulphate (0.00001).
Nitrite	Acetate (0.001), Fluoride (0.0008), Chloride (0.00005), Nitrate (0.00001), Sulphate (0.00001). Cyanide must be absent
Perchlorate	Thiocyanate (0.03), Iodide (0.02), Nitrate (0.02), Chloride (0.0003), Phosphate (0.0002), Acetate (0.0001).
Potassium	Rubidium (2), Caesium (0.4), Ammonium (0.01), Sodium (0.0004), Calcium (0.0003), Magnesium (0.0003), Lithium (0.0001).
Silver	Sulphide and Mercury should be absent or in very low concentrations relative to Silver
Sodium pvc	Potassium (0.6), Ammonium (0.2), Calcium (0.02), Magnesium (0.03).
Sulphide	Silver and mercury should be absent
Thiocyanate	Silver, Sulphide, Chloride and Iodide must be absent. Small interference from Bromide and Thiosulphate.