

Orion pH, ORP and ISE Applications

Species/Sample	Electrode	ISE Applications and References	
		Method	Reference
Aluminum (Al ³⁺) Newsprint Pulp	94-09, 96-09	Titration with silver fluoride	B1202
Amino Groups	94-17, 96-17	Titration with silver nitrate	B712
Ammonia (NH ₃) Air and Stack Gases	95-12	Direct	B678
Beer	95-12	Direct or known addition	B877
Biological Samples	95-12	Direct or known addition	B682, B817
Boiler Feed Water	95-12	Direct	B841
Fertilizers	95-12	Direct	B574
Fish Tanks	95-12	Direct	B607
Plating Baths	95-12	Direct	IM95-12
Sea Water	95-12	Known addition	B571, B607, B829, B1019
Soils	95-12	Direct	A502, ASTM, B502 B510, B563, B571, EPA
Shrimp	95-12	Direct	B1023
Water and Waste Water	95-12	Direct	B1019, A502, B563, EPA, B563, B510, B571, SM, ASTM
Wine and Musts	95-12	Known addition	B715
Ammonium (NH ₄ ⁺) Air	93-18, 95-12	Direct, direct as ammonia	IM93-18, B678
Arsenic (As ³⁺)	96-78, 97-78	Redox titration with potassium	IM96-78/97-78
Azide (N ₃ ⁻)	94-16, 96-16	Titration with silver nitrate	B359
Boron (B ³⁺) Graphite	93-05	Titration	ASTM, B1202
Plant Tissues and Soils	93-05	Direct as fluoroborate	B162, B583, B1200
Reactor Coolants	93-05	Direct as fluoroborate	B1200, B583
Silicon	93-05	Direct as fluoroborate	B766
Bromide (Br ⁻) Soils and Plant Tissues	94-35, 96-35	Direct	B799, B891
Wines	94-35, 96-35	Known addition	B821
Bromine (Br ₂) Organic Compounds	94-16, 96-16	Titration with silver nitrate	B814, B513
Cadmium (Cd ²⁺) Fluoroborate Plating Baths	94-48, 96-48	Direct	B377
Calcium (Ca ²⁺) Beer	93-20, 97-20	Known addition	AB8a
Boiler Feed Water	93-20, 97-20	Direct	IM93-20/97-20
Food Stuffs	93-20, 97-20	Direct	AB9, B148
Skim Milk	93-20, 97-20	Direct	B109
Soils and Fertilizers	93-20, 97-20	Direct	B253, B559, B650
Sugar Solutions	93-20, 97-20	Direct or known addition	B436, B463
Water	93-20, 97-20	Direct	B159, B248, B698
Wines	93-20, 97-20	Known addition	B770
Carbon Dioxide (CO ₂) Bacterial Cultures	95-02	Direct	B757
Carbonated Beverages	95-02	Direct	IM95-02
Wines	95-02	Direct	IM95-02
Chloride (Cl ⁻) Acid Copper Baths	94-17, 96-17	Known addition	B377
Boiler Cleaning Soln	94-17, 96-17	Known subtraction	B196
Canned Vegetables	94-17, 96-17	Direct	A205
Fish Cakes	94-17, 96-17	Direct	A207
Infant Formula	94-17, 96-17	Direct	A206
Milk	94-17, 96-17	Direct	A212
Non-liquid Dairy Products	94-17, 96-17	Direct	A202
Processed Meats	94-17, 96-17	Direct	A204
Salad Dressing and Mayonnaise	94-17, 96-17	Direct	A213
Tomato Sauce and Paste	94-17, 96-17	Known addition	A203
Plant Tissues	94-17, 96-17	Titration with silver nitrate	B184, B413
Sea Water	94-17, 96-17	Direct	B270, B511
Silicate Rock	94-17, 96-17	Direct	B496
Soils	94-17, 96-17	Direct or titration	B370, B422, B677
Water, Wastewater and Brines	94-17, 96-17	Direct	IM94-17, A507
Chlorine (Cl ₂) Residual Chlorine	97-70	Direct as iodine	A505, IM97-70, EPA
Chromium (Cr ⁶⁺) Cu-Cr Alloys	96-78, 97-78	Titration with Fe(NH ₄) ₂ (SO ₄) ₂	ASTM
Steels and Cast Iron	96-78, 97-78	Titration	ASTM

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Chymotrypsin	94-09, 96-09	Indirect	B225
Copper (Cu ²⁺) Acid Plating Baths	94-29, 96-29	Direct	B377
Natural Water	94-29, 96-29	Known addition	B565
Silicon	94-29, 96-29	Known addition	B565, B874
Cyanate (CNO) Water	95-12	Known addition	Standard methods
Cyanide (CN) Biological Materials	94-06, 96-06	Direct	B1024
Cigarette Smoke	94-06, 96-06	Direct	B459
Plant Tissues	94-06, 96-06	Direct	B168
Plating Baths	94-06, 96-06	Direct, known addition	B377, B506, B543, B718
Water, Wastewater and Brines	94-06, 96-06	Direct	ASTM
Epoxy Groups	94-35, 96-35	Titration	B266
Fluoride (F ⁻) Acids	94-09, 96-09	Direct	B78, B609, B860
Air and Stack Gases	94-09, 96-09	Direct	ASTM, B9, B285, B328, B554, B570
Aluminum Fluoride	94-09, 96-09	Direct	B532
Bones	94-09, 96-09	Direct	B29
Samples with Boron	94-09, 96-09	Direct	B768
Carbonated Beverages	94-09, 96-09	Direct	B204
Chromium Plating Baths	94-09, 96-09	Direct	B6
Coal	94-09, 96-09	Direct	B831
Cryolite	94-09, 96-09	Direct	B24, B75, B307, B329, B532
Dental Plaque	94-09, 96-09	Direct	B177
Drinking Water	94-09, 96-09	Direct	ASTM, A503, B61, B113, B16, B313, B501, B536
Feces	94-09, 96-09	Direct	B512
Feeds	94-09, 96-09	Known addition	B60, B223, B697
Fish	94-09, 96-09	Direct	B160, B214, B767, B830
Fluomica	94-09, 96-09	Direct	B830
Fluorospar	94-09, 96-09	Direct	B307, B532
Fluorosilicic Acid	94-09, 96-09	Direct	B232
Glass	94-09, 96-09	Known addition	B760
Minerals	94-09, 96-09	Direct	B24
Phosphate Rocks	94-09, 96-09	Direct	B140, B238, B547
Phosphoric Acid	94-09, 96-09	Direct	B448
Pickling Baths	94-09, 96-09	Direct	B860
Plant Tissues	94-09, 96-09	Direct	B881
Rain Water	94-09, 96-09	Direct	B551
Saliva	94-09, 96-09	Direct	B555, B594
Seawater	94-09, 96-09	Direct	B132, B213, B270, B470, B482, B501
Biological Fluids	94-09, 96-09	Direct	B62, B167, B396, B670, B252, B750
Silicate Rocks	94-09, 96-09	Direct	B300, B518
Soils	94-09, 96-09	Direct	B881, B406, B564
Sugar Canes	94-09, 96-09	Direct	B497
Teeth	94-09, 96-09	Direct	B271, B917
Toothpastes	94-09, 96-09	Direct	B739, B34, B478
Tungsten	94-09, 96-09	Direct	B12
Uranium Oxides	94-09, 96-09	Direct	B48
Uranyl Nitrate	94-09, 96-09	Direct	B111
Urine	94-09, 96-09	Direct	B142, B210, B503
Vitamins	94-09, 96-09	Known addition	B208
Wines	94-09, 96-09	Direct	B548, B672
Zirconium Decladding	94-09, 96-09	Direct	B111
Fluoroborate (BF ₄ ⁻) Plating Baths	93-05	Direct	B377, B837
Hydrogen Chloride in Air	94-17, 96-17	Direct	B782

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Iodide (I ⁻) Feeds and Plants	94-53, 96-53	Direct	B389
Milk	94-53, 96-53	Known addition	B1041
Selenium	94-53, 96-53	Known addition	B375
Iodine (I ₂) Pharmaceuticals	94-53, 96-53	Direct	B175, B181
Iron (Fe ²⁺ , Fe ³⁺)	96-78, 97-78	Redox titration with ceric sulfate	IM96-78/97-78
Silicate Rocks	96-78, 97-78	Back titration	B811
Lead (Pb ²⁺) Organic Compounds	94-82, 96-82	Titration	B1013
Lithium (Li ⁺) Water	94-09, 96-09	Titration	B36
Manganese (Mn ²⁺) Ore	96-78, 97-78	Titration with KMnO ₄	ASTM, B1213
Nickel (Ni ²⁺) Water	94-29, 96-29	Titration	B148
Nitrate (NO ₃ ⁻) Atmospheric Particles	93-07, 97-07	Direct	B772
Baby Foods	93-07, 97-07	Direct	B849
Fertilizers	93-07, 97-07	Direct	B923
Limestone	93-07, 97-07	Direct	B320
Organic Compounds	93-07, 97-07	Direct	B880
Pickling Baths	93-07, 97-07	Sample addition	B806
Plant Tissues	93-07, 97-07	Direct	B77, B187, B283, B413, B578, B855
Potable Water	93-07, 97-07	Direct	B283
Potatoes	93-07, 97-07	Direct	B424
Soils	93-07, 97-07	Direct	A103, A104, B65, B283, B338, B366, B374, B578, B785
Sulfuric Acid	93-07, 97-07	Direct	B374
Wastewater and Sea Water	95-46	Direct	IM95-46
Nitroacetate (NTA)	96-78, 97-78	Titration	B667
Nitrite (NO ₂ ⁻) Fish	95-46	Known addition	B876
Soils	95-46	Direct	B734
Water	93-46, 97-46	Direct	IM93-46/97-46
Nitrogen Oxide (NO _x) Air	95-46	Known addition	IM95-46
Stack Gases	93-07, 97-07	Indirect as nitrate	B274, B360, B582
Oxygen (BOD)	97-08	Direct	A516, IM97-08
Potassium (K ⁺) Feldspar	93-19, 97-19	Known addition	B794
Fertilizer	93-19, 97-19	Known addition or direct	A101
Soils	93-19, 97-19	Direct	IM93-19/97-19
Wines	93-19, 97-19	Direct	IM93-19
Protein Water	94-16, 96-16	Indirect	B668
Silver (Ag ⁺) Low Levels	94-16, 96-16	Direct	B171
Cyanide Plating Baths	94-16, 96-16	Known addition	B377, B718
Sodium (Na ⁺) Foods	84-11, 86-11	Known addition	B878
Feldspar	84-11, 86-11	Known addition	B794
Plant Tissues	84-11, 86-11	Direct	B851
Pulping Liquors	84-11, 86-11	Direct or sample addition	B456
Sulfate (SO ₄ ²⁻) Water	94-82, 96-82	Titration	B108, B530, B887, B889
Sulfide (S ²⁻) Water	94-16, 96-16	Direct	B639, B692
Wood Chips	94-16, 96-16	Direct	B681
Sulfur (S) Coal	94-82, 96-82	Titration	B659
Pulping Liquors	94-82, 96-82	Titration	B916
Water and Solid Samples	94-48, 96-48	Titration	B1028, B1032
Thioglycolic Acid Hair Dye	94-16, 96-16	Titration	B393, B517, B805
Thiols Petroleum Products	94-16, 96-16	Titration	B596
Urea Biological Fluids	95-12	Direct as ammonia	B728
Fertilizer	95-12	Direct as ammonia	B922
Vitamin B ₁ Pharmaceutical	94-82, 96-82	Titration	B971