Petrochemical industry

Analytical methods for the quality control of petroleum products and renewable alternatives

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Crude oil is a highly complex mixture of hydrocarbons and other compounds that through desalting, distillation, desulfurization, and conversion is transformed into higher quality hydrocarbons such as liquefied gas, gasoline, diesel, heating fuel, and lubricants, as well as a large variety of other products.

The refinement process is demanding and requires precise and reliable analysis. Metrohm provides top-quality analytical instruments, know-how, and first-class, on-site service to enable and support your petrochemical processing needs.
The table below serves as an overview of several parameters of interest that can be analyzed by different techniques using Metrohm instrumentation. More detailed information is found in the corresponding linked Metrohm application documents. Missing your application here? Please contact your local Metrohm organization to discuss possible solutions.

Process step	Parameter and Matrix	Standard	Analysis technique	Application document
Exploration & production	Acid number in crude oil	ASTM D8045, ASTM D664	Thermometric titration, Potentiometric titration, Process analysis	AB-404, AB-427, AN-PAN-1037, WP-012
	Salinity of crude oil*	ASTM D6470, ASTM D3230	Potentiometric titration*, Conductivity measurement, Process analysis	AN-PAN-1014
	Water content in crude oil*	ASTM D4928, ISO 10337, IP 386, ASTM D6304*, ASTM D4377, ISO 10336, IP 356, ISO 6296, IP 439	Coulometric Karl Fischer titration (KFC), Volumetric Karl Fischer titration (KFT)	AN-K-074, AB-280
	Scavenger amines in crude oil		Ion chromatography with mass spectroscopy (IC-MS)	AN-M-005, WP-082
	Organic chlorine content in crude oil*	ASTM D4929, ASTM D8150	Potentiometric titration, Combustion ion chromatography (CIC)	AN-CIC-024
	Organic halides		Combustion ion chromatography (CIC)	AN-CIC-029
	Mercaptan sulfur in crude oil*	ASTM D3227, IP 342, UOP 163*, DIN 51796	Potentimetric titration, Raman spectroscopy, Process analysis	AN-T-028, AN-T-152, AB-135, AN-PAN-1026, AN-RS-050
	Alkalinity and hardness in brine (produced water)	ASTM D3875, ISO 22719	Potentiometric titration	AN-T-172
	Sulfate, chloride, nitrate in produced water		Ion chromatography	AN-S-261
	pH value of water	ASTM D1293, EN ISO 10523	pH measurement	AB-188
	Conductivity of water	ASTM D1125, EN 27888, ISO 7888	Conductivity measurement	AB-102
	Percentage of chloride in water	ASTM D512	Potentiometric titration	AB-130
Gas treating	H_2S, mercaptan sulfur, carbonyl sulfide in gaseous hydrocarbons, LPG, and LNG	UOP 212, EN ISO 6326-3, ASTM D2420, IP 272	Potentiometric titration, Process analysis	AB-135
	Heat-stable salts in the amines used for scrubbing H_2S		Ion chromatography	AN-S-389, AN-S-343, AN-S-144
	Percentage of amines in gas scrubber	UOP 825	Potentiometric titration, Process analysis	AN-PAN-1003
	Water content in glycol dryers	ASTM D6304, ASTM E1064, ASTM E203, ISO 6296, IP 439	Coulometric Karl Fischer titration (KFC), Volumetric Karl Fischer titration (KFT)	WP-061, AN-K-070
	Halogens and sulfur in LPG and LNG	ASTM D7994	Combustion ion chromatography (CIC)	AN-CIC-013, AN-CIC-018, AN-CIC-023
	Water content in LNG, gaseous fuels	EN ISO 10101, DIN 51869	Coulometric Karl Fischer titration (KFC)	
	Amines in discharged water from gas scrubbers		Ion chromatography	AN-C-164
	Basic nitrogen in LPG	UOP 939	Ion chromatography	AN-C-187

* Part of the NYMEX trading specification

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Process step	Parameter and Matrix	Standard	Analysis technique	Application document
Desalter	Salinity of crude oil	ASTM D6470, ASTM D3230	Potentiometric titration, Conductivity measurement, Process analysis	AN-PAN-1014
	Water content in crude oil	ASTM D4928, ISO 10337, IP 386 ASTM D4377, ISO 10336, IP 356, ISO 6296, IP 439	Coulometric Karl Fischer titration (KFC), Volumetric Karl Fischer titration (KFT)	AN-K-074, AB-280
	Alkalinity and hardness in brine (produced water)	ASTM D3875, ISO 22719	Potentiometric titration	AN-T-172
	Sulfate, chloride, nitrate in desalter water		Ion chromatography	AN-S-261
Alkylation unit	Sulfuric acid content	ASTM E223	Potentiometric titration	
	Organic fluoride in butane	ASTM D7994	Combustion ion chromatography (CIC)	AN-CIC-018
Gas treating (gas scrubber)	Amine content	UOP 825	Potentiometric titration	AN-PAN-1003
	Amines in discharged water from gas scrubbers		Ion chromatography	AN-C-164, AN-C-193
	Heat-stable salts in the amines used for scrubbing H_2S		Ion chromatography	AN-S-389, AN-S-343, AN-S-144
	Spent caustic (%Hydroxide)		Potentiometric titration	
	Trapped H_2S content		Potentiometric titration	AB-135
	Organic acids in scrubber solutions		Ion chromatography	AN-O-017
Hydro-desulfurization	Bromine number	ASTM D1159, IP 130, ISO 3839, BS-2000, UOP 304	Potentiometric titration	AB-177, AN-T-182, AN-T-187
	H_2S content	ASTM D3227, IP 342, UOP 163, ISO 3012	Potentiometric titration	AB-135, AN-PAN-1026
	Ammonia in process water		Ion measurement, Process analysis	AN-PAN-1001
	Olefin content		NIR spectroscopy	

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Process step	Parameter and Matrix	Standard	Analysis technique	Application document
Process water	Amines		Ion chromatography	WP-082
	Chlorides		Potentiometric titration, Ion chromatography	AB-130, AN-S-249
	Alkalinity		Potentiometric titration	AB-178, AN-T-205
	H_2S content		Potentiometric titration, Process analysis	AN-T-032, AN-PAN-1001
	Ammonia		Ion measurement, Process analysis	AN-PAN-1001
	pH value	EN ISO 10523	pH measurement	AB-188, AN-T-205
	Cyanide		Ion chromatography	AN-P-052
	Anions (nitrate, nitrate, chloride, bromide, iodide, phosphate, sulfate)	ASTM D8234	Ion chromatography	AN-S-378
	Sulfur spieces besides anions (amidosulfonate, thiosulfate, thio-cyanate, dithionate, and imidodisulfonate)		Ion chromatography	AN-S-390
Corrosion monitoring	Corrosion mechanism	ASTM G05, ASTM G61, ASTM G100, ASTM G150	Electrochemistry	AN-COR-001, AN-COR-003, AN-COR-006, AN-COR-011, AN-COR-012, AN-COR-019, WP-044, WP-069
	Corrosion rate analysis	ASTM G102, ASTM G59	Electrochemistry	AN-COR-019, AN-COR-002
	Corrosion inhibitors	ASTM G185	Electrochemistry	AN-COR-005, AN-COR-014, AN-COR-015
	Corrosion in pipe-flow (turbulent flow) conditions	ASTM G185	Hydrodynamic electrochemistry	AN-COR-014, AN-COR-015, WP-055, WP-069
	Hydrogen permeation	ASTM G148	Electrochemistry	AN-EC-028, WP-069, AN-EC-032
	Corrosion analysis with EIS	ASTM G106	Electrochemical Impedance Spectroscopy (EIS)	AN-EIS-001, AN-EIS-002, AN-EIS-004
	Corrosive ions		Ion chromatography	AN-S-261, AN-S-390

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Product	Parameter	Standard	Analysis technique	Application document
Gasoline * Part of the specification ASTM D4814	Water content*	ASTM D6304*, ASTM D7923, EN ISO 12937, IP 438, DIN 51777	Coulometric Karl Fischer titration (KFC), NIR spectroscopy, Process analysis	WP-061, AN-K-014, AB-209, AN-PAN-1047
	Research octane number (RON)*	ASTM D8340	NIR spectroscopy, Process analysis	AN-NIR-022
	Motor octane number (MON)*	ASTM D8340	NIR spectroscopy, Process analysis	AN-NIR-022
	Oxygenates content	ASTM D8340	NIR spectroscopy	
	Anti-Knock index (AKI)*	ASTM D8340	NIR spectroscopy	AN-NIR-022
	Density*	ASTM D8340	NIR spectroscopy, Process analysis	AN-NIR-022
	Aromatics content*	ASTM D8340	NIR spectroscopy, Process analysis	AN-NIR-022
	Olefin content*	ASTM D8340	NIR spectroscopy, Process analysis	
	Benzene content*	ASTM D8340	NIR spectroscopy, Process analysis	
	Acid number	ASTM D664, IP 177, EN 12634, IP 449, UOP 565, ASTM D974	Potentiometric titration, Photometric titration	AB-404, AN-T-179
	Bromine index	ASTM D2710, IP 299, ASTM D5776, ASTM D1492, UOP 304	Potentiometric titration, Coulometric titration	AB-177, AB-340, AN-T-206, AN-T-207, AN-K-067
	Bromine number	ASTM D1159, IP 130, ISO 3839, BS-2000, UOP 304	Potentiometric titration	AB-177, AN-T-182, AN-T-187
	Mercaptan sulfur	ASTM D3227, IP 342, UOP 163, ISO 3012	Potentiometric titration, Raman spectroscopy, Process analysis	AB-135, AN-PAN-1026, AN-RS-050
	Elemental sulfur		Voltammetry	AN-V-085
	Mixing of RON / MON standards		Liquid handling	80006022
	Lead in aviation gasoline	ISO 3830	Potentiometric titration	AN-T-029
Fuel ethanol (Bioethanol) * Part of the specification ASTM D4806	Water content*	ASTM D7923, ASTM E1064*, ASTM E203*, ISO 6296, IP 439, EN 15489	Coulometric Karl Fischer titration (KFC), Volumetric Karl Fischer titration (KFT)	WP-061, AN-K-014, AB-209, AN-PAN-1047
	Acidity*	ASTM D7995, EN 15491	Potentiometric titration	AN-T-199, AN-T-200
	Inorganic chloride*	ASTM D7319*, ASTM D7328, ASTM D6751, EN 15492, EN 15484, ASTM D512	Ion chromatography, Potentiometric titration	AN-S-241, 80006007
	Existent sulfate*	ASTM D7318, ASTM D7319, ASTM D7328, EN 15492	Potentiometric titration, Ion chromatography	80006020, AN-S-241, AN-S-211
	Total sulfate*	ASTM D7319, ASTM D7328, EN 15492	Ion chromatography	AN-S-241, AN-S-211
	pHe value*	ASTM D6423, EN 15490	pH measurement	AN-T-173, AN-T-183
	Conductivity	EN 15938	Conductivity measurement	AN-T-209
	Anions (fluoride, acetate, formate, nitrate, sulfate)		Ion chromatography	AN-S-244

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Product	Parameter	Standard	Analysis technique	Application document
Diesel	Cetane number	ASTM D8340	NIR spectroscopy, Process analysis	
	Cold filter plug point (CFPP)	ASTM D8340	NIR spectroscopy, Process analysis	AN-NIR-080
	Flash point	ASTM D8340	NIR spectroscopy, Process analysis	AN-NIR-080
	FAME (Fatty acid methyl esters)	ASTM D8340	NIR spectroscopy, Process analysis	
	Cetane index	ASTM D8340	NIR spectroscopy, Process analysis	AN-NIR-080
	D95	ASTM D8340	NIR spectroscopy, Process analysis	AN-NIR-080
	Viscosity	ASTM D8340	NIR spectroscopy	AN-NIR-080
	Water content	ASTM D6304, EN ISO 12937, IP 438, DIN 51777	Coulometric Karl Fischer titration (KFC), NIR spectroscopy, Process analysis	WP-061, AN-K-014, AN-K-070, AB-209, AN-NIR-096
	Acid number	ASTM D664, IP 177, EN 12634, IP 449, UOP 565	Potentiometric titration	AB-404, AN-T-179
	Bromine index	ASTM D2710, IP 299, ASTM D5776, ASTM D1492, UOP 304	Potentiometric titration, Coulometric titration	AB-177, AB-340, AN-T-206, AN-T-207, AN-K-067
	Bromine number	ASTM D1159, IP 130, ISO 3839, BS-2000, UOP 304	Potentiometric titration	AB-177, AN-T-182, AN-T-187
	Mercaptan sulfur	ASTM D3227, IP 342, UOP 163	Potentiometric titration, Raman spectroscopy, Process analysis	AB-135, AN-PAN-1026, AN-RS-050
	Density	ASTM D8340	NIR spectroscopy, Process analysis	
Biodiesel	Free and total glycerin in B5	ASTM D7591	Ion chromatography	AN-P-068
	Oxidation stability*	EN 14112, EN 15751*, EN 16568, ASTM D6751	Stability measurement	AN-R-009, AN-R-034
	Water content	ASTM D6304, EN ISO 12937, IP 438, DIN 51777	Coulometric Karl Fischer titration (KFC)	AB-209
	Organic chlorine in renewable diesel feedstock	ASTM D7359, UOP 991	Combustion ion chromatography (CIC)	
	Total, inorganic, and organic chlorine	UOP 588	Potentiometric titration	
	Acid number*	ASTM D664*, IP 177, EN 14104, EN 12634, IP 449	Potentiometric titration	AB-404, AN-T-179
	Iodine number	EN 14111	Potentiometric titration	80006020

* Part of the specifications ASTM D6751 (B100) and ASTM D7467 (B6-20)

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Product	Parameter	Standard	Analysis technique	Application document
Kerosene (Aviation fuel) * Part of the specification ASTM D1655	Cetane index		NIR spectroscopy, Process analysis	AN-NIR-025
	API gravity		NIR spectroscopy, Process analysis	AN-NIR-025
	Flash point		NIR spectroscopy, Process analysis	AN-NIR-025
	Density		NIR spectroscopy, Process analysis	AN-NIR-025
	Freeze point		NIR spectroscopy, Process analysis	AN-NIR-025
	Aromatics content		NIR spectroscopy, Process analysis	AN-NIR-025
	Acidity*	ASTM D3242*, IP 354, UOP 565, EN 12634	Photometric titration	
	T10, T20, T50		NIR spectroscopy, Process analysis	
	Hydrogen content		NIR spectroscopy	AN-NIR-025
	Saturates		NIR spectroscopy, Process analysis	
	Water content	ASTM D6304, EN ISO 12937, IP 438, DIN 51777	Coulometric Karl Fischer titration (KFC), NIR spectroscopy	WP-061, AN-K-070, AB-209
	Bromine index	ASTM D2710, IP 299, ASTM D5776, ASTM D1492, UOP 304	Potentiometric titration, Coulometric titration	AB-177, AB-340, AN-T-206, AN-T-207, AN-K-067
	Bromine number	ASTM D1159, IP 130, ISO 3839, BS-2000, UOP 304	Potentiometric titration	AB-177, AN-T-182, AN-T-187
	Mercaptan sulfur*	ASTM D3227*, IP 342, UOP 163	Potentiometric titration, Raman spectroscopy, Process analysis	AB-135, AN-PAN-1026, AN-RS-050
	Viscosity		NIR spectroscopy	AN-NIR-025
Sustainable aviation fuel (SAF) * Part of the specification ASTM D7566	Acid number*	ASTM D3242*, IP 354 UOP 565	Photometric titration	
	Mercaptan sulfur*	ASTM D3227*, IP 342, UOP 163	Potentiometric titration	AB-135
	Water content*	ASTM D6304*, EN ISO 12937, IP 438, DIN 51777	Coulometric Karl Fischer titration (KFC)*, NIR spectroscopy, Process analysis	WP-061, AN-K-070, AB-209
	Total fluorine, chlorine, and sulfur content*	ASTM D7359	Combustion ion chromatography (CIC)	
	Iodine number in feedstock	AOCS Cd 1d-92, EN 14111	Potentiometric titration	AB-141, AN-T-109

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Product	Parameter and Matrix	Standard	Analysis technique	Application document
Reformate, isomerate	Research octane number (RON)	ASTM D8340	NIR spectroscopy, Process analysis	AN-NIR-113, AN-NIR-114, AN-PAN-1052
	Motor octane number (MON)	ASTM D8340	NIR spectroscopy, Process anlaysis	AN-PAN-1052
	Density	ASTM D8340	NIR spectroscopy	AN-NIR-114
	Aromatics content	ASTM D8340	NIR spectroscopy, Process anlaysis	AN-NIR-114
	Olefin content	ASTM D8340	NIR spectroscopy, Process anlaysis	AN-NIR-114
	Water content	ASTM D6304, EN ISO 12937, IP 438, DIN 51777	Coulometric Karl Fischer titration (KFC)	AB-209, WP-061, AN-K-070
	Acid number	ASTM D664, IP 177, EN 12634, IP 449	Potentiometric titration	AB-404, AN-T-179
	Mercaptan sulfur	ASTM D3227, IP 342, UOP 163	Potentiometric titration, Raman spectroscopy, Process analysis	AB-135, AN-PAN-1026, AN-RS-050
	Bromine index (ppm / low level)	ASTM D2710, IP 299, ASTM D5776, ASTM D1492, UOP 304	Potentiometric titration, Coulometric titration	AB-177, AB-340, AN-T-206, AN-T-207, AN-K-067
	Bromine number	ASTM D1159, IP 130, ISO 3839, BS-2000, UOP 304	Potentiometric titration	AB-177, AN-T-182, AN-T-187
Petroleum distillates	Bromine index (ppm / low level)	ASTM D2710, IP 299, ASTM D5776, ASTM D1492, UOP 304	Potentiometric titration, Coulometric titration	AB-177, AB-340, AN-T-206, AN-T-207, AN-K-067
	Bromine number	ASTM D1159, IP 130, ISO 3839, BS-2000, UOP 304	Potentiometric titration	AB-177, AN-T-182, AN-T-187
	Water content	ASTM D6304, EN ISO 12937, IP 438, DIN 51777	Coulometric Karl Fischer titration (KFC)	AB-209, WP-061, AN-K-070
	Total fluorine, chlorine, and sulfur content	ASTM D7359, UOP 991	Combustion ion chromatography (CIC)	
	Total, inorganic, and organic chlorine	UOP 588	Potentiometric titration	
	Mercaptan sulfur	ASTM D3227, IP 342, UOP 163, ISO 3021	Potentiometric titration, Raman spectroscopy, Process analysis	AB-135, AN-PAN-1026, AN-RS-050
	Acid number	ASTM D664, IP 177, EN 12634, IP 449, UOP 565	Potentiometric titration	AB-404, AN-T-179

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Product	Parameter and Matrix	Standard	Analysis technique	Application document
Pygas	Diene value (Maleic anhydride value)	UOP 326	Potentiometric titration, NIR spectroscopy	AN-NIR-024
	Bromine number	ASTM D1159, IP 130, ISO 3839, BS-2000, UOP 304	Potentiometric titration, NIR spectroscopy	AB-177, AN-T-182, AN-T-187, AN-NIR-094
Marine fuels	Chloride in methanol for marine fuels		Ion chromatography	
	Acid number*	ASTM D664*, IP 177, EN 12634, IP 449, UOP 565	Potentiometric titration	AB-404, AN-T-179
	Mercaptan sulfur	ASTM D3227, IP 342, UOP 163	Potentiometric titration	AB-135, AN-PAN-1026
	Water content	ASTM D4928	Coulometric Karl Fischer titration (KFC)	AN-K-074
	Oxidation stability of biodiesel added to fuel	EN 14112, EN 15751*, EN 16568, ASTM D6751	Stability measurement	AN-R-009, AN-R-034
	Organic halogens and sulfur	ASTM D8150	Combustion ion chromatography (CIC)	AN-CIC-024

* Part of the specification ISO 8217

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Product	Parameter and Matrix	Standard	Analysis technique	Application document
Lubricants and additives	Acid number	ASTM D664, IP 177, ISO 6618, ISO 6619, EN 12634, IP 449	Potentiometric titration, Thermometric titration, NIR spectroscopy, Lab robotics	AB-404, AN-T-096, AN-T-179, AN-NIR-041, AN-NIR-071
	Base number	ASTM D2896, ISO 3771, IP 276, IP 400	Potentiometric titration, Thermometric titration, Conductometric titration, NIR spectroscopy, Lab robotics	AB-405, AN-T-097, AN-T-098, AN-T-179, AN-NIR-097
	Base number in service	ASTM D4739	Potentiometric titration	
	Water content	ASTM D6304, EN ISO 12937, IP 438, DIN 51777, ASTM E1064	Coulometric Karl Fischer titration (KFC), NIR spectroscopy	WP-061, AB-209, AB-280, AN-NIR-041
	Hindered phenolic and aromatic amine antioxidant content (Remaining useful life (RUL))	ASTM D6971	Voltammetry	AN-V-220, WP-085
	ipH value	ASTM D7946	pH measurement	
	Viscosity		NIR spectroscopy	AN-NIR-041
	Saponification number	ASTM D94, ISO 6293-1, ISO 6293-2	Potentiometric titration, Photometric titration	
	Bromine index	ASTM D2710, IP 299, ASTM D5776, ASTM D1492, UOP 304	Potentiometric titration, Coulometric titration	AB-177, AB-340, AN-T-206, AN-T-207, AN-K-067
	Bromine number	ASTM D1159, IP 130, ISO 3839, BS-2000, UOP 304	Potentiometric titration	AB-177, AN-T-182, AN-T-187
	Chloride		Combustion ion chromatography (CIC)	AN-CIC-014
	Amines		Ion chromatography	AN-C-177
Aromatic chemicals	Water content	ASTM E1064	Coulometric Karl Fischer titration	AB-137, AB-209
	Bromine index	ASTM D2710, IP 299, ASTM D5776, ASTM D1492, UOP 304	Potentiometric titration, Coulometric titration	AB-177, AB-340, AN-T-206, AN-T-207, AN-K-067
	Acidity	ASTM D1613, ASTM D847	Potentiometric titration	AN-T-203
	Organic halides in aromatics	ASTM D7359	Combustion ion chromatography (CIC)	AN-CIC-024
	Chloride in aromatics	ASTM D5194	Potentiometric titration	AB-130

Analysis techniques

TITRATION – SPECIFIC, ACCURATE, AND RELIABLE

Potentiometric titration is a well-established method for monitoring corrosion indicators, such as acidity or mercaptan sulfur content, or analyzing quality parameters of the final products. It is included in many standards and specifications due to its reliability. Titration is an inexpensive method that can be automated to optimize laboratory efficiency.

KARL FISCHER TITRATION – THE ACCURATE METHOD FOR WATER DETERMINATION

Water is a common contaminant in petroleum products. It affects lubricant properties, promotes microbial growth, leads to sludge formation in the tank, and promotes corrosion.
Karl Fischer titration is highly reproducible and accurate, making it one of the most important methods for water determination. Both volumetric and coulometric Karl Fischer titration can be used, with KF coulometry being preferred for low water content in petroleum products.

NIR SPECTROSCOPY – MULTI-PARAMETER ANALYSIS WITHIN MINUTES

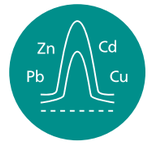
Near-infrared (NIR) spectroscopy can be used to assess the quality of fuels and lubricants quickly. Compared to traditional methods, results can be obtained within one minute without the need for additional reagents or chemicals.

ION CHROMATOGRAPHY – HIGHLY EFFICIENT AND ROBUST ANALYSIS

Ion chromatography (IC) is a precise multi-parameter method for quantifying ionic impurities in fuels, lubricants, or produced water.
When combined with a combustion oven, combustion ion chromatography (CIC) can effectively analyze the content of organic halides and sulfur even in challenging matrices, such as crude oil.
Using Metrohm Inline Matrix Elimination to remove the matrix of fuels and solvents increases the robustness of the analysis and system.
The hyphenation of ion chromatography with mass spectrometers allows detection of anions and organic components (organic acids, amines) at low concentration levels.

PROCESS ANALYSIS – DEPENDABLE ONLINE, INLINE, AND ATLINE SOLUTIONS

Online monitoring of parameters such as corrosion indicators or ionic constituents in process and wastewater optimizes process efficiency and reduces production costs. Metrohm Process Analytics provides various analytical techniques for such purposes, including titration, photometry, ion chromatography, and NIR spectroscopy.
The same high quality Metrohm laboratory techniques from the laboratory can now be used right on the process line for the most accurate results delivered directly to the process control room.



VOLTAMMETRY – HIGHLY SENSITIVE ANALYSIS OF TRANSITION METALS AND ANTIOXIDANTS IN LUBRICANTS

Voltammetry is a sensitive method (LODs in the µg/L range) for analyzing electrochemically active substances, including transition metals such as iron or copper in fuels. It can also be used to evalute the remaining amout of antioxidants in lubricants, accurately determining their remaining useful life.
This technique offers wide range of applications, short analysis times, and high precision with low instrumentation cost.

STABILITY – SIMPLE, CONVENIENT, AND EFFICIENT MEASUREMENT

Petroleum products can oxidize when exposed to air and the resulting reaction products can cause problems in combustion engines. In particular, polymeric, poorly soluble compounds lead to deposits in and blockages of the fuel injector systems. Oxidation stability is a crucial property of petroleum products that can be monitored to prevent such issues.

ELECTROCHEMISTRY – SOLUTIONS FOR FUNDAMENTAL AND APPLIED RESEARCH

Corrosion is prevalent in the petrochemical industry, particularly in the areas of production, transport, and refining. The chemical composition of the crude, high pressure, and high temperature all promote corrosion.
To prevent corrosion, it is essential to understand the corrosion process. Electrochemical methods provide a detailed depiction of corrosion processes, as outlined in numerous publications and international standards.

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