

RDE-OES Product Line



Cost-effective and high-performance OAS



Ultra High-sensitive OAS



Designed for mobility application

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OA800P Ultra High-sensitive OAS



Superior Performance

Focal length: 750mm
Detectors: 16 pieces CMOS



Aviation Application

More Precise Result (1-10ppm)



Up to Standard

ASTM D6595; ASTM D6728;



OA800P

OA800P Ultra High-sensitive OAS



Aviation Customer Requirement

Elements	Fe	Al	Cu
Warning Value (ppm)	6.0	3.0	5.0

Detection Limit

Elements	LOD(ppm)	Elements	LOD(ppm)	Elements	LOD(ppm)
Fe	0.16	Si	0.73	P	0.85
Al	0.05	Ti	0.14	Ba	0.16
Mg	0.03	Pb	0.09	B	0.01
Zn	0.1	Sn	1.03	Mn	0.06
Cu	0.02	Mo	0.12	Sb	0.38
Ag	0.05	V	0.44	Li	0.01
Ni	0.27	Cd	0.08	Na	0.16
Cr	0.14	Ca	0.78	K	0.1



OA800P

OA800P Ultra High-sensitive OAS




3ppm Standard Oil Testing Result

Elements	Average (ppm)	Test 1 (ppm)	Test 2 (ppm)	Test 3 (ppm)	Test 4 (ppm)	SD
Fe	2.93	2.87	2.97	2.86	3.01	0.074
Al	2.74	2.69	2.73	2.76	2.79	0.043
Mg	3.29	3.16	3.3	3.3	3.38	0.091
Zn	3.1	3.09	3.12	3.05	3.13	0.036
Cu	3.1	3.06	3.09	3.1	3.14	0.033
Ag	3.07	2.99	3.06	3.08	3.14	0.062
Ni	3.14	3.03	3.08	3.16	3.3	0.118
Cr	2.83	2.77	2.85	2.89	2.81	0.052
Si	3.2	3.26	3.16	3.15	3.24	0.056
Ti	3	2.99	3	2.99	3.02	0.014
Pb	2.97	2.95	2.94	3.07	2.93	0.066
Sn	3.12	2.99	3.14	3.19	3.17	0.091
Mo	2.9	2.84	2.86	2.95	2.96	0.061
V	3.13	3.11	3.15	3.08	3.18	0.044
Cd	3.11	3.1	3.1	3.12	3.14	0.019
Ca	2.95	2.93	2.97	2.89	3.03	0.060
P	2.84	2.87	2.8	2.65	3.02	0.154
Ba	2.03	1.89	2.04	1.73	2.48	0.323
B	3.03	3.01	3.01	3.02	3.08	0.034
Mn	3.07	3.05	3.09	3.03	3.12	0.040
Na	2.65	2.51	2.54	2.84	2.7	0.153




Low Concentration Oil Sample Testing Result

Elements	Average (ppm)	Test 1 (ppm)	Test 2 (ppm)	Test 3 (ppm)	Test 4 (ppm)	SD
Fe	0.58	0.56	0.6	0.59	0.58	0.021
Al	0.45	0.44	0.48	0.42	0.45	0.031
Mg	0.95	0.8	0.97	1.07	0.95	0.137
Zn	0.66	0.65	0.69	0.65	0.66	0.023
Cu	0.63	0.61	0.65	0.64	0.63	0.021
Ag	0.56	0.57	0.59	0.52	0.56	0.036
Ni	0.61	0.81	0.45	0.56	0.61	0.184
Cr	0.45	0.47	0.41	0.48	0.45	0.038
Si	0.85	0.82	0.94	0.8	0.85	0.076
Ti	0.24	0.13	0.26	0.32	0.24	0.097
Pb	0.24	0.24	0.29	0.19	0.24	0.050
Sn	0.63	0.53	0.64	0.7	0.63	0.086
Mo	0.57	0.51	0.6	0.59	0.57	0.049
V	0.84	0.8	0.88	0.84	0.84	0.040
Cd	0.69	0.65	0.74	0.69	0.69	0.045
Ca	0.73	0.68	0.75	0.75	0.73	0.040
P	0.26	0.17	0.3	0.31	0.26	0.078
Ba	0	0	0	0	0	0.000
B	0.55	0.52	0.6	0.52	0.55	0.046
Mn	0.69	0.67	0.7	0.68	0.69	0.015
Na	0.79	0.76	0.79	0.82	0.79	0.030




Comparison of Key Parameters

Parameters	OA800H 	OA800M 	OA800P 
Detector	15 pieces CCD	8 pieces CCD	16 pieces CMOS
Focal length	500mm	500mm	750mm
Dispersion	1.35mm/nm	1.35mm/nm	1.80mm/nm
Physical parameters	80*60*42cm 70Kg	77*54*36cm 69Kg	104*70*46cm 125Kg
Chambers and its range	2 chambers 200nm ~ 470nm 470nm ~ 800nm	2 chambers 200nm ~ 470nm 470nm ~ 800nm	1 chamber 200nm ~ 800nm
Installation	Bench-top	Mobile	Bench-top




Comparison of General Features

Parameters	OA800H 	OA800M 	OA800P 
Up to 24 elements	√	√	√
Compliance to ASTM-D6595(Lube), and ASTM-D6728(fuel)	√	√	√
Constant Temp Control	√	√	√
Curve Calibration	√	√	√
Pixel Calibration	√	√	√
Repeatable and Sensitive	√	√	√

Comparison of General Features

Parameters	OA800H 	OA800M 	OA800P 
No Sample Preparation	√	√	√
No cooling water nor argon gas	√	√	√
Minimal Training	√	√	√
Low Cost per sample	√	√	√
Cost effective	√	√	√
Low Detection Limit (< 3ppm)	×	×	√
Fire-proof Cover	√	√	√
Laser Safety Detector	√	√	√

Comparison of Mobile Performance

Parameters	OA800H 	OA800M 	OA800P 
Designed for Frequent Transportation	×	√	×
Compact and Light Weight	×	√	×
Shock and Vibration Resistance	×	√	×
Mobile Box for Easy Transportation	×	√	×
All Tools Integrated	×	√	×
Built-in Touch Screen, Keyboard, Sharpener, Scanner	×	√	×

Measure Range

No.	Elements	Element's symbol	Measuring Range (ppm)
1	Aluminum	Al	0-1000
2	Barium	Ba	0-6000
3	Boron	B	0-1000
4	Cadmium	Cd	0-1000
5	Calcium	Ca	0-6000
6	Chromium	Cr	0-1000
7	Copper	Cu	0-1000
8	Iron	Fe	0-1000
9	Lead	Pb	0-1000
10	Magnesium	Mg	0-6000
11	Manganese	Mn	0-1000
12	Molybdenum	Mo	0-1000
13	Nickel	Ni	0-1000
14	Phosphorus	P	0-6000
15	Silicon	Si	0-1000
16	Silver	Ag	0-1000
17	Sodium	Na	0-6000
18	Tin	Sn	0-1000
19	Titanium	Ti	0-1000
20	Vanadium	V	0-1000
21	Zinc	Zn	0-6000
22	Potassium	K	0-1000
23	Lithium	Li	0-1000
24	Antimony	Sb	0-1000

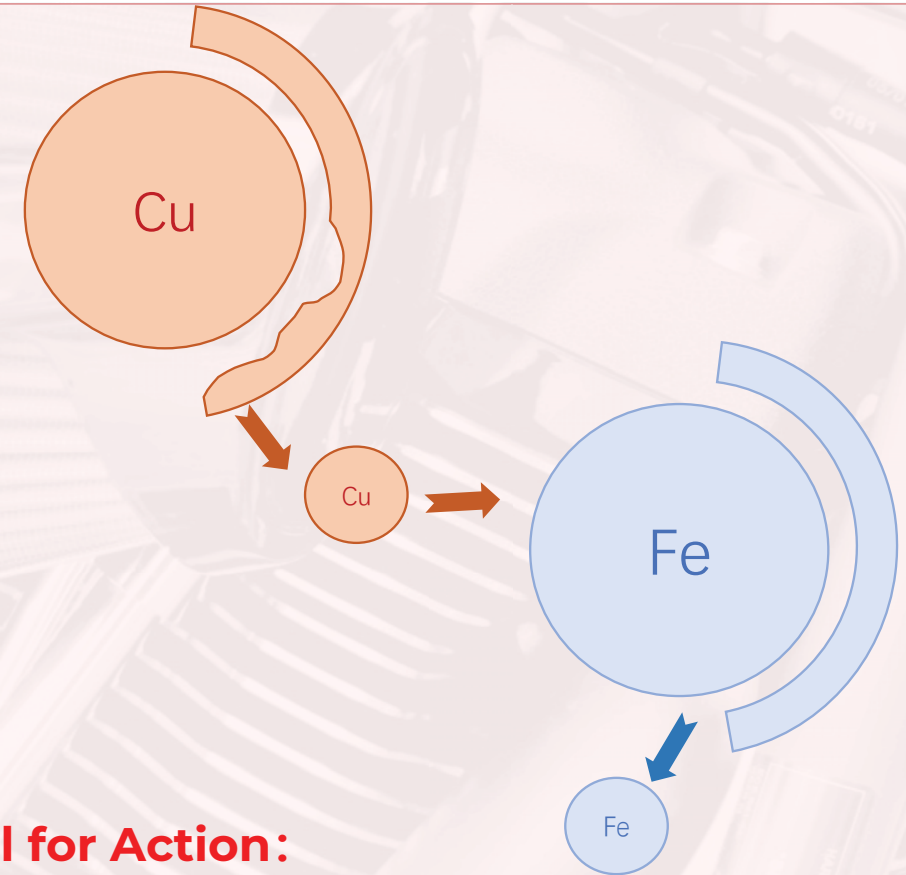
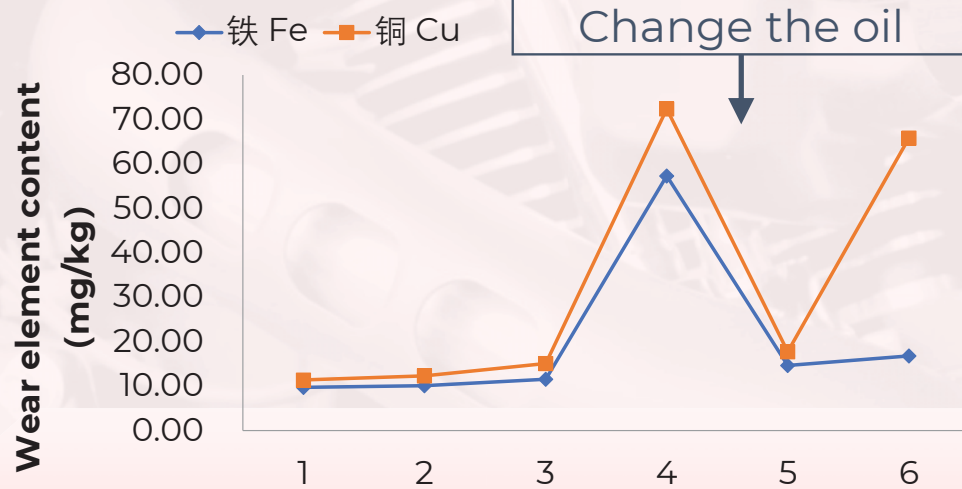
Main Sources of Some Detected Elements

No.	Elements	Main Source
1	Fe	Cylinder liner, bearing, valve, piston ring, crankshaft, CAM, rocker arm, gear, piston pin, etc.
2	Cu	Bearings, bushings, gears, oil coolers, valves, etc.
3	Al	Piston, bearing shell, box, bearing retainer, oil tank, oil pump, gasket, etc.
4	Pb	Bearings, bushings, seals, greases, etc.
5	Sn	Bearing, bushing, piston ring, welding parts, etc.
6	Ni	Bearing alloys, gas turbine blades, turbine blades, valves, etc.
7	Cr	Piston, cylinder liner, rolling bearing, etc.
8	Ag	Bearing retainer, plunger pump, gear, spindle, bearing, piston pin, etc.
9	Ti	Turbine blade, turbine support shaft, compressor wheel, etc.
10	Na	Coolant leakage, seawater contamination, grease, etc.
11	Si	Dust, seals, additives, etc.
12	Mg	Additives, aircraft engine or ship engine casing, etc.
13	Ca	Additives (dispersants), etc.
14	P	Additives, coolant leakage, etc.
15	Ba	Additives
16	Zn	Additives (wear-resistant agents) ,Brass part, etc.

Case Study- Find The Broken Parts

Lubricating oil monitoring data of a diesel engine (unit: mg/kg)

No.	1	2	3	4	5	6
Fe	9.72	10.12	11.52	57.31	14.65	16.77
Cu	11.39	12.30	15.09	72.37	17.73	65.82



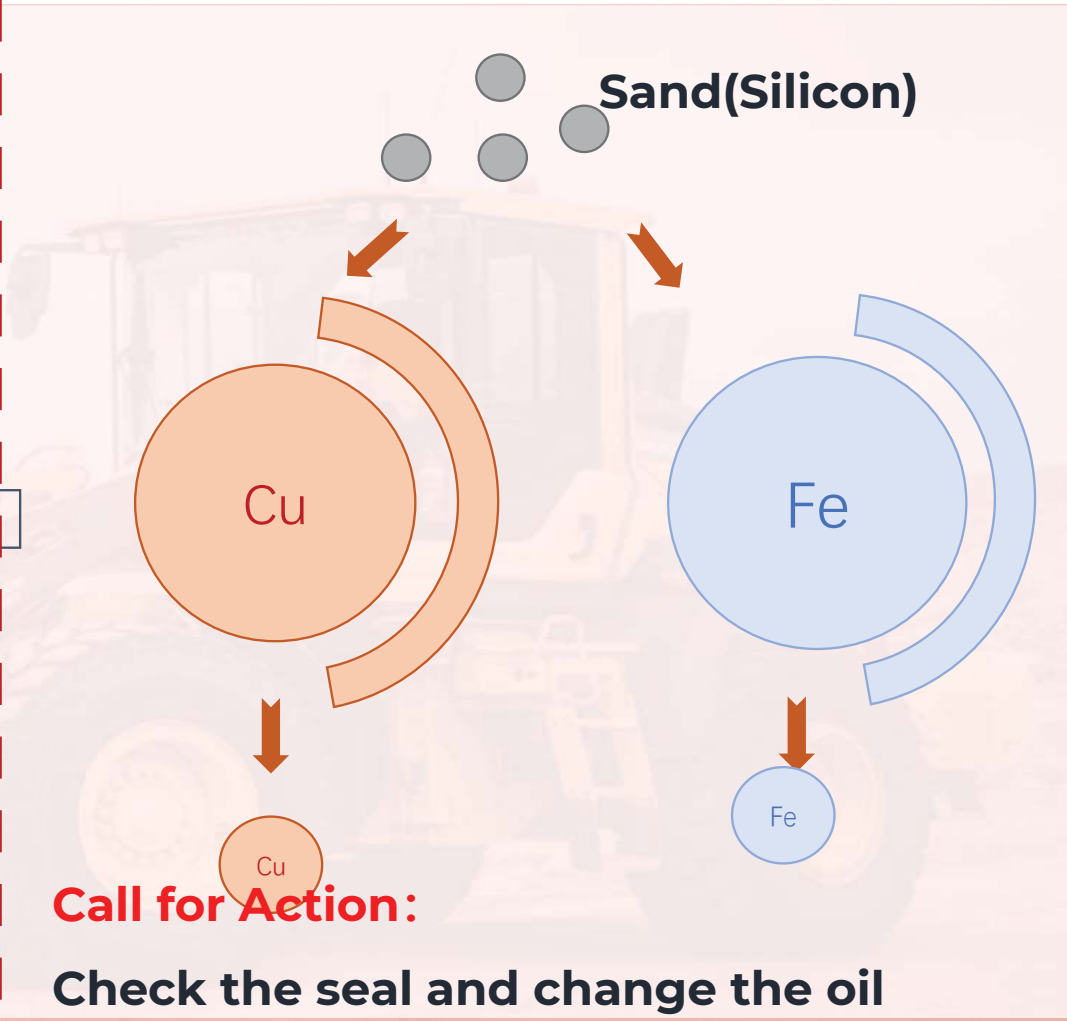
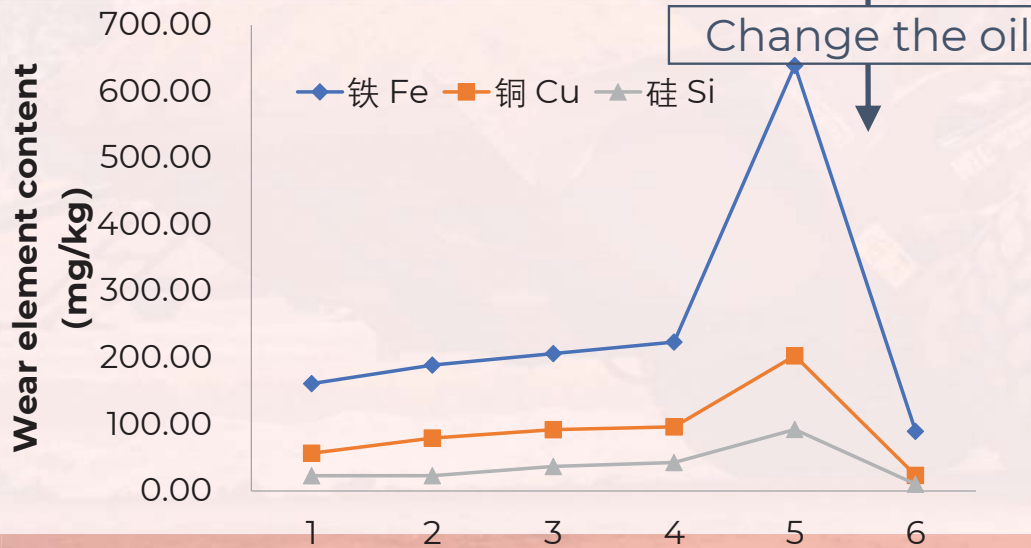
Call for Action:

Check all Cu component to find the broken parts

Case Study- Find The Pollution Elements

Monitoring data of mining car transmission lubricating oil (unit: mg/kg)

No.	1	2	3	4	5	6
Fe	161.34	189.23	206.39	223.61	639.03	89.71
Cu	56.79	79.34	92.16	96.27	203.15	23.35
Si	22.97	23.11	37.10	42.95	92.37	10.32



Detection Techniques of Metal Elements in Oil

NO.	Comparative item	RDE-OES (this project technology)	ICP-OES with oil injector	AAS
1	Test Time	2 mins	> 30mins	> 36 Hours
2	Pre-processing Requirement	No	Pre dilution or equip an oil injector	Digestion > 1 day
3	Detection Precision	ppm	ppb	ppb
4	Working on Site	Yes	No	No
5	Cooling Water and gases	No	Yes	Yes
6	Environmental conditions	Ship, work site	Laboratory conditions	Laboratory conditions
7	Factory Built-in Working Curve	Yes	No	No
8	Operator Requirement	Simple training	Professional	Professional

Consumables



Disc electrode



Rod electrode



Sample cup

Use every test



Standard Oil
Calibration