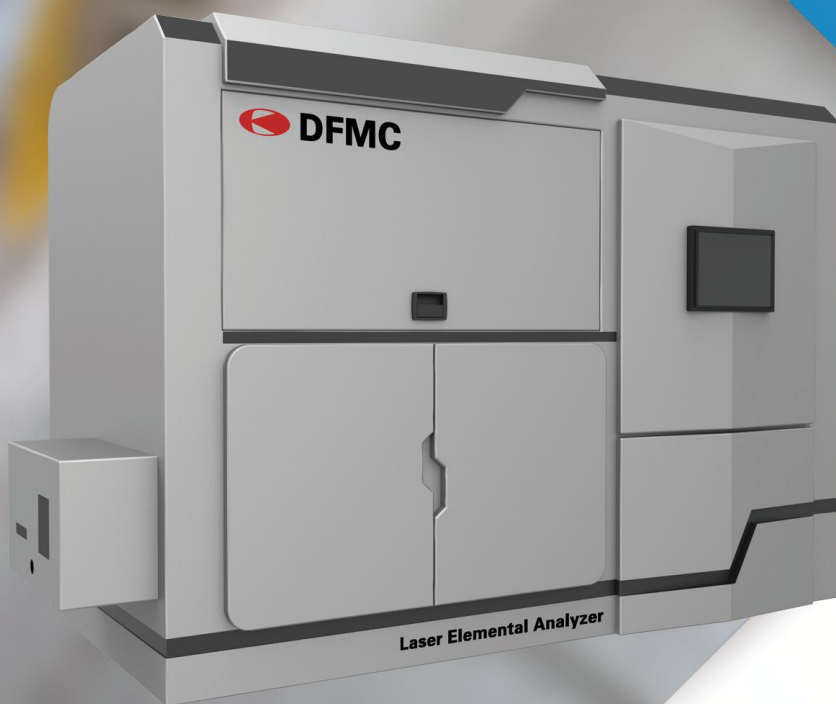


# LEA

Laser Elemental Analyzer



# Laser Elemental Analyzer

## 1. Product Overview

Laser Elemental Analyzer (LEA) is based on laser element analysis technology (LEAT). It can replace traditional chemical analysis methods and achieve rapid analysis of the tested material. The online or by-pass elemental detection and analysis for solid material can be realized in the process flow. Meanwhile, liquid materials contents also can be detected and analyzed by plug-in or flow-leading method. LEA can analyze the content of major elements in real time and can meet the real-time detection requirements for material composition and industrial indicators in the process flow of ingredients, mixed materials, etc.. It can effectively monitor and control the production process, improve product quality, and save production costs, improve economic efficiency. In addition, the harmful components of PPM level content in the on-site materials can be detected to improve the safety of the production process.

## 2. Product Model



Figure 1 LEAT Liquid Material Multi-elemental Analyzer (Plug-in/ Flow-leading)

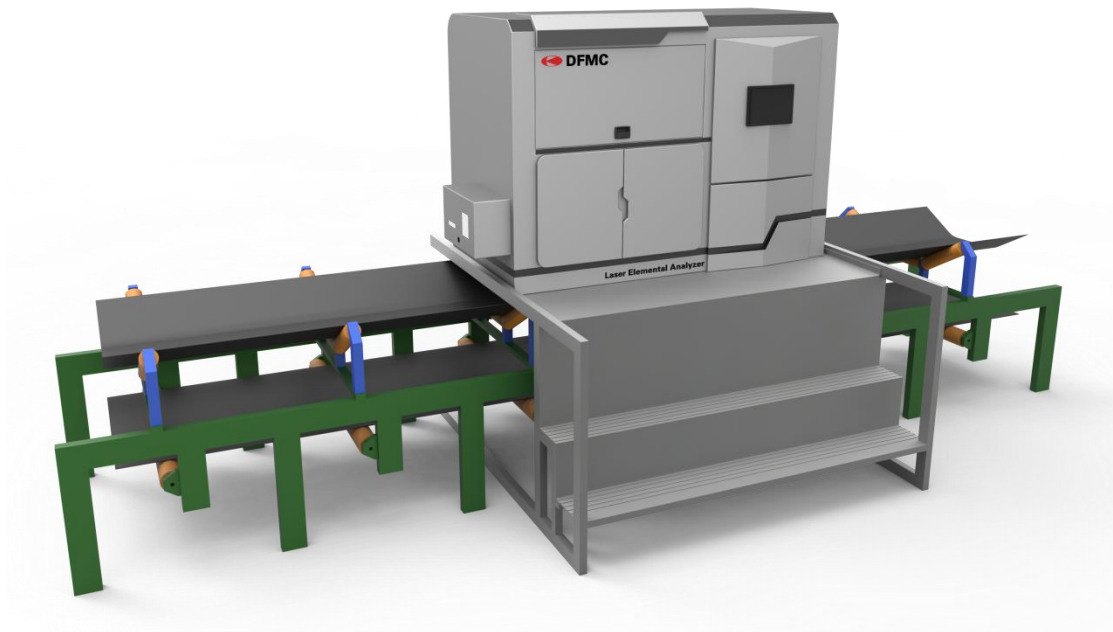


Figure 2 LEAT Solid Material Multi-elemental Analyzer (Online)

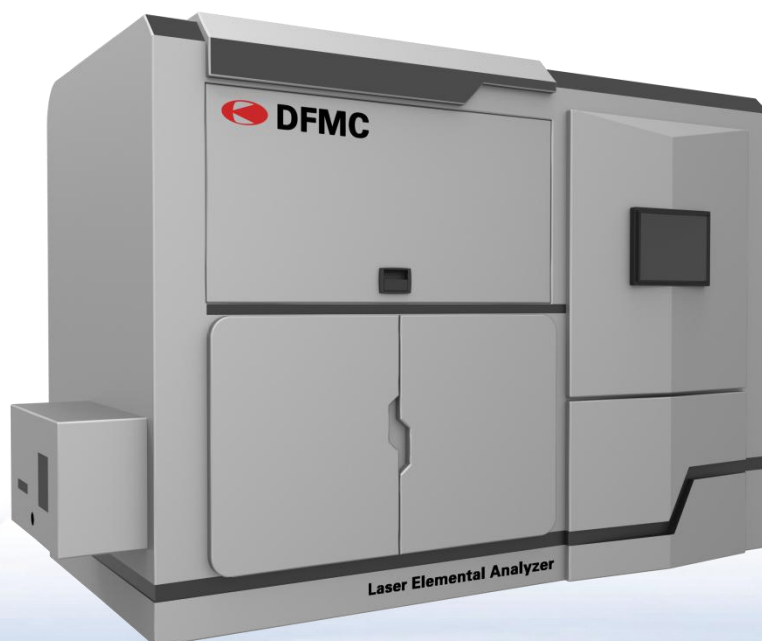
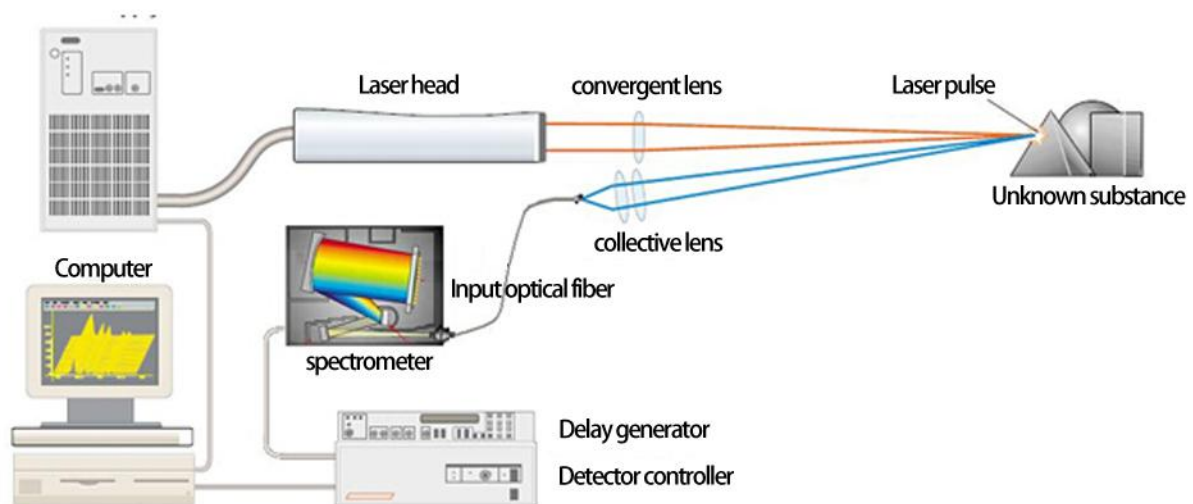


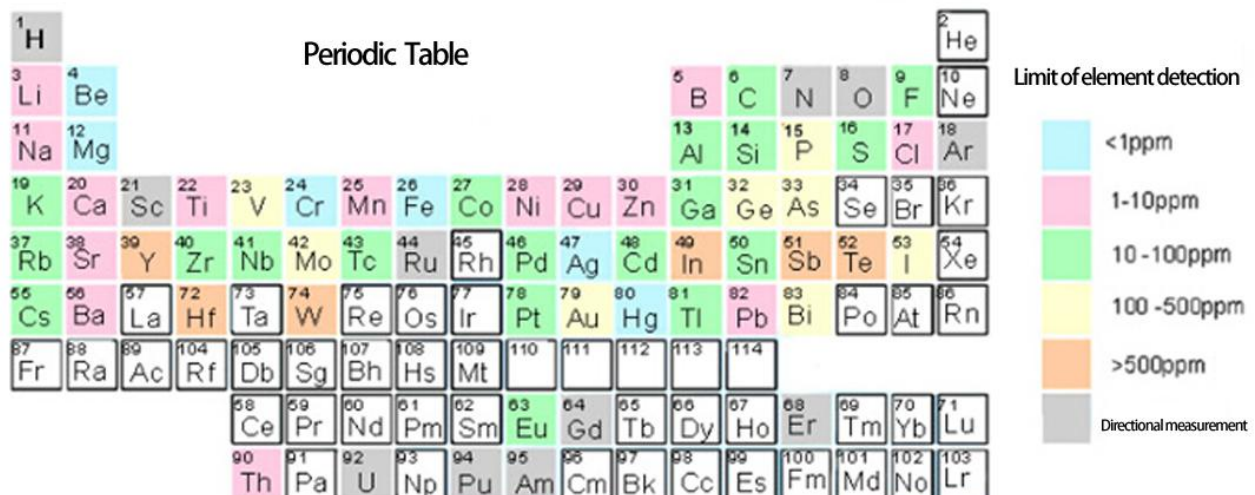
Figure 3 LEAT Solid Material Multi-elemental Analyzer (By pass)

### 3. Operating Principle

LEA adopts laser spectroscopy analysis technology. This technique is an element analysis technique based on atomic emission spectrum and laser plasma emission spectrum. The pulsed laser with high power and high energy density is used to irradiate the tested material. It instantly reaches a high temperature above 6000°C and burns the surface of the tested material. Under the action of high temperature, the surface of the tested material absorbs photons to generate initial free electrons. Under the further action of laser power, atoms absorb energy to generate more free electrons and cause avalanche effect, forming the electro-neutral transient plasma. The electro-neutral transient plasma is composed of a large number of atoms, ions and free electrons. Then this plasma is cooled rapidly, and the excited ions are returned to the low energy state to produce characteristic spectral radiations. The plasma emission spectrum contains linear spectrum with abundant information of sample elements and continuous spectrum with background information. The content of the characteristic elements can be directly calculated by spectroscopic analysis of the characteristic lines of atoms and ions in the plasma emission spectrum.



**Periodic Table**



Periodic Table																	
1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110	111	112	113	114				
		58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu		
		90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr		

**Limit of element detection**

- <1ppm
- 1-10ppm
- 10-100ppm
- 100-500ppm
- >500ppm
- Directional measurement

#### 4. Product Features

- It can realize high precision full element measurement, PPM level content detection.
- Non-contact, rapid, continuous, large amount of material detection.
- Solid material, liquid material detection.
- It is almost non-destructive testing, the consumption material is only calculated by gram.
- No radioactivity, excellent safety, the work safety of frontline personnel is guaranteed.
- Low cost of use and maintenance.
- Well-adapted at site, little modification to the process transformation.

#### 5. Technical Parameters

- C、H、O、N、Si、Al、Fe、Ca、Mg、K、Na、Ti and many other elements
- LEA can detect PPM level material content.
- Precision: the sample precision is affected by the matrix composition of the mineral, mineral character, particle size, production process and so on.
- Solid and liquid material detection.
- According to the customer's needs, the quantitative analysis of the main components of the material is carried out. The secondary components of the material are analyzed, such as the harmful substances, or the qualitative analysis of the unknown materials.
- Stability: under designated conditions, stability is no more than 0.3%, and long-term drift can be automatically corrected.
- Analysis time: the measurement time can be adjusted
- Ambient temperature: 0 °C~40 °C; relative humidity is no more than 70%.

- Power supply: AC 220V 50Hz, power consumption is less than 2000W.

## 6. Product Application

- Research on the testing technology of the main coal quality characteristics of the coal as fired in power plant, including the important coal quality indexes that affect the safety, economy and clean combustion of the boiler in the power plant: calorific value, volatile, coal ash fusibility, moisture content and ash content;
- Detect alkali metal elements (K, Na) in coal;
- Detect sulfur dioxide and nitrogen oxide generation index;
- Detect trace harmful elements (As, Hg) and so on;
- Composition analysis of cement raw meal, clinker, sintered material and so on;
- Composition analysis of ore and mineral powder;
- Ingredient analysis of slurry, solution and solid liquid two phase liquid material.

## 7. Expected Effect

- Monitor material quality, control material ratio and save cost;
- Monitor mixture quality, control deviation, and guide production process optimization;
- Control pollution emissions;
- Improve the fine management level of the production process.



Add.: No.136 Binjiang Middle Road, Yanjiang Development Zone, Dandong, Liaoning, China

Tel.: +86 415 3862214

Fax: +86 415 3862272

E-mail: [intersales@dfmc.cc](mailto:intersales@dfmc.cc)

<http://en.dfmc.cc/>