



## GA505 Portable Multi - Parameter Hair Drugs Analyzer



## Portable Multi - Parameter Hair Drugs Analyzer

**GA505**

### Feature

- **Advanced technology:** Rare earth luminescence technology is a new rapid test technology of immunoassay with the highest accuracy.
- **Multi-channel detection:** Can detect single card and multi-connected card, and multi-connected card supports up to five-connected card.
- **Detectable items:** Morphine, crystal meth, ketamine, etc.
- **Rapid test:** Multi-channel, faster and more efficient detection.
- **High sensitivity:** Can detect the minimum drug content of 0.2ng/mg, in line with the industry standard of the anti-drug association.
- **Automatic detection:** Use of program control motor, automatic card entry or return, simple and convenient operation.
- **Storage convenience:** Hair can be stored at room temperature, while urine, blood and other samples generally need to be cryopreserved at low temperature.
- **Long traceability period:** Longest hair can be used to detect whether the suspicious person's body contains drugs within 3~6 months.
- **Quantitative accuracy:** Accurate sampling method, constant experimental process, to ensure a higher reference quantitative test results.
- **Easy to carry:** All needed for testing are packed in a test box with a suitcase of about 20 inches.

### Application

- Public security anti-drug
- Driving school drug testing
- Community drug supervision

### Description

During a drug scene, suspects do not cooperate, making it difficult for police to obtain body fluids and conduct drug tests.

Keratin is the main component of human hair, about 97%. When a person takes drugs, the narcotics will be involved in the body's metabolism, and the metabolites will enter the keratin in the new hair. For hair that has already grown, narcotics metabolites can also enter the body through sweat glands or sebum secretion. The drug component in the urine can not be detected in 5~10 days after taking drugs, but the hair will not necessarily fall off for months or even years, faithfully recording what has happened in the body.

GA505 portable hair narcotics trace fast detector, using advanced time-resolved ultraviolet fluorescence immunoassay technology, an easily generate the test results of the drug concentration in the sample within 10 minutes, can quickly and accurately detect the results of morphine, methamphetamine and ketamine to meet the needs of qualitative analysis.

GA505 portable hair drugs analyzer, **one-time can detect three to five drugs**, improve the detection efficiency, the standard 4 g, BT, WIFI, thermal paper printing module, id identification module, adapted to the drug control departments in the laboratory to early screening of drug addicts hair, can also be used for security forces out the law enforcement, Input the identity information of drug users on the spot, and print the results directly as the basis for on-site inspection and disposal of anti-drug police.



# 1. Background

With the rapid development of globalization and society, drug crimes in China are prone to high incidence and abuse. The relevant departments of the state attach great importance to anti-drug scientific research. Among them, improving drug detection technology has become an important part of drug control research.

During a drug scene, suspects do not cooperate, making it difficult for police to obtain body fluids and conduct drug tests. In order to solve the current public security anti-drug police urine, saliva detection means for drug absorption staff exist shortcomings, accurate service drug control combat, used for actual combat, close to the actual work needs, the Ministry of Public Security issued by the "standard of drug-related personnel hair samples", put forward for drug-related personnel hair sample extraction, storage, inspection and testing requirements. According to the requirements, my company developed GA503JTJ portable hair drug detector. At present, the product has obtained the product inspection report issued by the Ministry of Public Security Security and Police Electronic Product Quality Testing Center, and the hair drug detection system has obtained the software copyright, software products and the science and technology novelty search report issued by the provincial science and technology departments.

# 2. Advantages

In order to accurately judge whether drug addicts take drugs, what kind of drugs they have taken, and whether drug residues are still in the body of drug addicts, the application of various drug detection technologies has become an important link in drug control scientific research. The main test subjects are: hair drug test, blood test, urine test and saliva test.

Table 1 Comparison of various detection methods

	Urine	Saliva	Blood	Hair
Degree of difficulty of obtaining materials	Easy	Easy	Hard	Easy
Sample preservation requirements	High	High	High	Low
Difficulty of sample adulteration	Easy	Hard	Hard	Hard
The sample is easily contaminated	Low	High	Low	Low
Timeliness of detection t	2~3 days	1~2 days	24 hours	2 weeks to 6 months after narcotics use

Hair as a legal biological sample has incomparable advantages. There are dense capillaries around the hair follicles. Drugs or drugs in the blood enter the hair follicles of the scalp from the blood during the growth of the hair, and are fixed by keratin proteins in the hair. It takes about 3~5 days for the hair containing the drugs to grow out of the scalp surface. Hair grows out at a relatively constant rate, a mechanism that can be used to infer information about the type, timing and dose of abuse. That's where the 'trace' test comes in.

Trace drugs detection technology in hair also has unique advantages, including long detection time, comprehensive drug or drug abuse information, anti-corruption samples, easy collection, easy to preserve, can be repeated sampling, etc. Trace drugs detection technology in hair also has unique advantages, including long detection time, comprehensive drug or drug abuse information, anti-corruption samples, easy collection, easy to preserve, can be repeated sampling, etc.

### 3. Technology

Time-resolved fluorescence analysis (TRFIA) is developed on the basis of fluorescence analysis (FIA). It is a special fluorescence analysis. According to the luminescence characteristics of lanthanide chelates, the fluorescence is measured by time-resolution technique, and the signal is resolved by detecting wavelength and time parameters simultaneously, which can effectively eliminate the interference of non-specific fluorescence and greatly improve the analytical sensitivity.

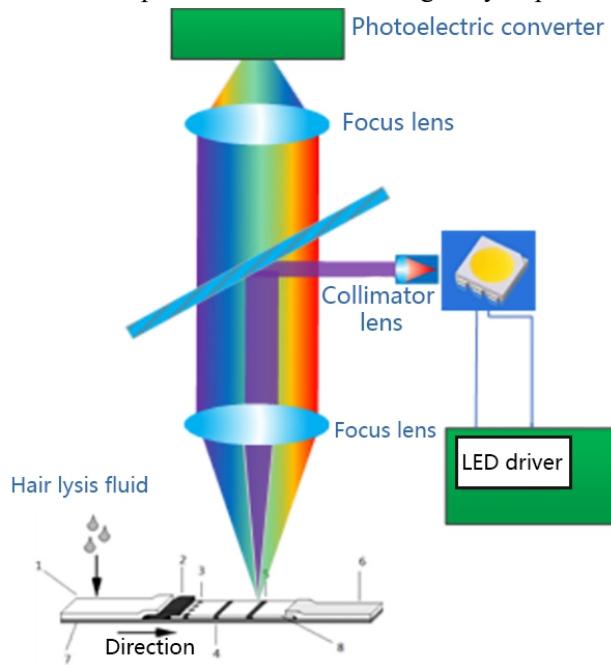


Figure 1 GA505 schematic

Fluorescence analysis takes advantage of the great difference between the fluorescence wavelength and its excitation wavelength to overcome the influence of variegated light in ordinary

UV-Vis spectrophotometry. At the same time, the fluorescence analysis is different from the ordinary spectrophotometry, the photoelectric acceptor and the excitation light are not in the same line, the excitation light can not directly reach the photoelectric acceptor, thus greatly improving the sensitivity of optical analysis. However, when ultramicroscopic analysis is carried out, the influence of stray light from excitation light becomes more serious. Therefore, resolving the influence of stray light of excitation light becomes the bottleneck of improving the sensitivity.

The best way to deal with the effects of stray light is, of course, to measure without the presence of excited light. However, the fluorescence lifetime of common fluorescence markers is very short, and the excitation light disappears, so does the fluorescence. However, a very small number of rare earth metals (Eu, Tb, Sm and Dy) have a long fluorescence lifetime, up to 1 ~ 2ms, which can meet the measurement requirements. Therefore, time-resolved fluorescence analysis method, which uses long-effective fluorescence markers to measure fluorescence intensity after the excitation light is turned off, has been developed.

However, a very small number of rare earth metals (Eu, Tb, Sm and Dy) have a long fluorescence lifetime, up to 1 ~ 2ms, which can meet the measurement requirements. Therefore, time-resolved fluorescence analysis method, which uses long-effective fluorescence markers to measure fluorescence intensity after the excitation light is turned off, has been developed.

## 4. Test Process



Figure 2 GA505 test process

## 5. Advantage

- 1) **Advanced Technically:** Rare earth fluorescence is a new and most accurate immunoassay technology.
- 2) **Rapid Detection:** The quantitative detection of drug content in hair samples of suspected persons can be quickly completed within 10 minutes.
- 3) **High Sensitive:** The quantitative detection of drug content in hair samples of suspected persons can be quickly completed within 10 minutes.
- 4) **Convenient Sampling:** A little hair (5mg), no privacy, avoid adulteration.
- 5) **Convenient Store:** Hair can be stored at room temperature, while urine, blood and other materials generally need to be stored at low temperature and frozen.
- 6) **Period Long:** The use of hair can detect the longest 3-6 months in the body of the suspect whether there are drugs.
- 7) **Constant Environment:** Using a constant temperature incubator can effectively eliminate the influence of factors such as time and room temperature on the reaction.
- 8) **Accurate Quantitative:** Accurate sampling method and constant experimental process ensure higher reference quantitative test results.
- 9) **Use Easy:** The precise operation can be achieved by simply training the inspectors.
- 10) **Field Test:** The necessary instruments, reagents and other accessories are all packed in the test box of about 20 inches of luggage.

## 6. Parameter

- 1) Screen: 7 inch color LCD touch screen, multi-level screen brightness adjustable.
- 2) Interface language: Default simplified Chinese, support English operation interface.
- 3) Operating system: Android intelligent operating system, support APP application, remote data upgrade, data upload, data summary, troubleshooting, information encryption and other advantages.
- 4) Data storage: 8G database can store 10W historical data.
- 5) Interface support: 4G, Micro USB, wifi connect for data upload.
- 6) Printing function: built-in 58mm thermal printer, can also be connected to a peripheral printer via Bluetooth for data printing.
- 7) The bar code identification module can be customized to identify one and two - dimensional bar

codes.

## 7. Comparison With Other Methods

Table 2 Comparison of different detection methods

	Chromatography	ELISA	GICA	TRFIA
Test time	2 hours	2 hours	2-10 mins	5-10 mins
Sensitivity	High	Low	Low	High
Operating steps	Hard	Hard	Easy	Easy
Specificity	High	High	Low	Low
On-site inspection	Unrealizable	Unrealizable	Realizable	Realizable
Cost			Low	High

## 8. Accessories List

Table 3 GA500 configuration list

Model	Accessories	Num.	Unit	Remark
Intelligent detector	Handheld rapid hair drug detector	1	Set	Rare earth method on-site rapid tester
Hair sampling tool	Ordinary scissors	1	Piece	Sampling and processing tools
	Sampling tweezers	1	Piece	Sampling and processing tools
Rapid analysis of hair drugs consumables	Rectangular sampling bag	20	Set	Hair sampling bag, paper envelope
	Alcohol wiping paper	1	Box	Tool disinfection cup
	Black oily pen	1	Branch	Marking pen
	Weighing paper	1	Bag	Square, 100 pieces
	Hair pre-treatment apparatus	1	Set	6 samples were processed at a time

## 9. Optional Accessories

Table 4 GA505 Optional accessories

Num.	Test item	Quantity per box	Test limit
1	Methamphetamine	50 people / serving	0.2ng/mg
2	Morphine	50 people / serving	0.2ng/mg
3	6-Monoacetylmorphine	50 people / serving	0.2ng/mg
4	Ketamine	50 people / serving	0.2ng/mg
5	Ecstasy	50 people / serving	0.2ng/mg
6	Cocaine	50 people / serving	0.2ng/mg
7	Cannabis Sativa	50 people / serving	0.2ng/mg
8	Fentanyl	50 people / serving	0.2ng/mg
9	Caffeine	50 people / serving	0.2ng/mg
10	Methylcetone	50 people / serving	0.2ng/mg

## 10. Optosky Public Safety Product Line



Figure 3 Public security product series produced by Optosky (as of December 2020)

# 1. Company Profile

Optosky company is an first-class spectroscopy solution provider, with the headquarter locates in the 7<sup>th</sup> floor of the research institute of the Chinese Academic of Science at an area of 2500 square meter in Xiamen city where successfully held the international 9<sup>th</sup> BRICK summit in 2017. The subsidiary company locates in Wuhu city with an area of 2035 square meter.

The company founder Dr.Hongfei,Liu graduated Doctor degree from Chinese Academic of Science and postdoctoral degree from Xiamen University, by integrating both of top Universities' spectroscopy technology background into Optosky company aiming at developing the leading spectroscopy equipment in the world.

The company bases on unique technologies of Optomechatronics, Spectroscopy Analysis, Process Weak Optical and Electrical Signals, Cloud Computing, and have been developed wide products line of the competitive Raman spectroscopy instruments, micro spectrometer, hyperspectral imager, field spectroradiometer, fluorescence spectroscopy, LIBS etc. Driven by advanced technologies and products, Optosky brand has been well-known to customers all over the world.

Optosky company base on technologies innovation, market driven direction, customer first, provides first-class products and services, and one-stop solutions to many fortune 500 companies in many industries. The company received praise from different industries companies, as well as many innovative intellectual property, software copyright, qualification certification, and winner awards over hundred numbers.

Optosky receives top class A introduced high-tech company to international Xiamen city, the national high-tech and new innovative technology company award. The founder Dr.Hongfei Liu receives the innovation talent award by ministry of science and technology.

The company is currently conducting the exclusive project of major industrialization national oceanic administration with a total fund of five million us dollar. The company in charge of drafting national industry standard of VNIR and SWNIR Field Spectroradiometer, and six national standard drafter, including China National Standard Drafter for Hazmat detector based on Raman spectroscopy, China National Standard Drafter for Buoy-type Monitor eco-environment, China National Standard Drafter for water quality monitor in unmanned boat,

China National Standards drafter for online water quality monitor by spectroscopy, China  
 National Standard Drafter for UV-absorbent measure fabrics.

The company has over 70 IPs and over 20 innovative patents.

The company received ISO9001:2015 certification, CE certification, Police Administration Certification, FDA approval compliant, IQOQPQ compliant.



Figure 4 Optosky (Xiamen) Photonics Inc. Company Headquarter

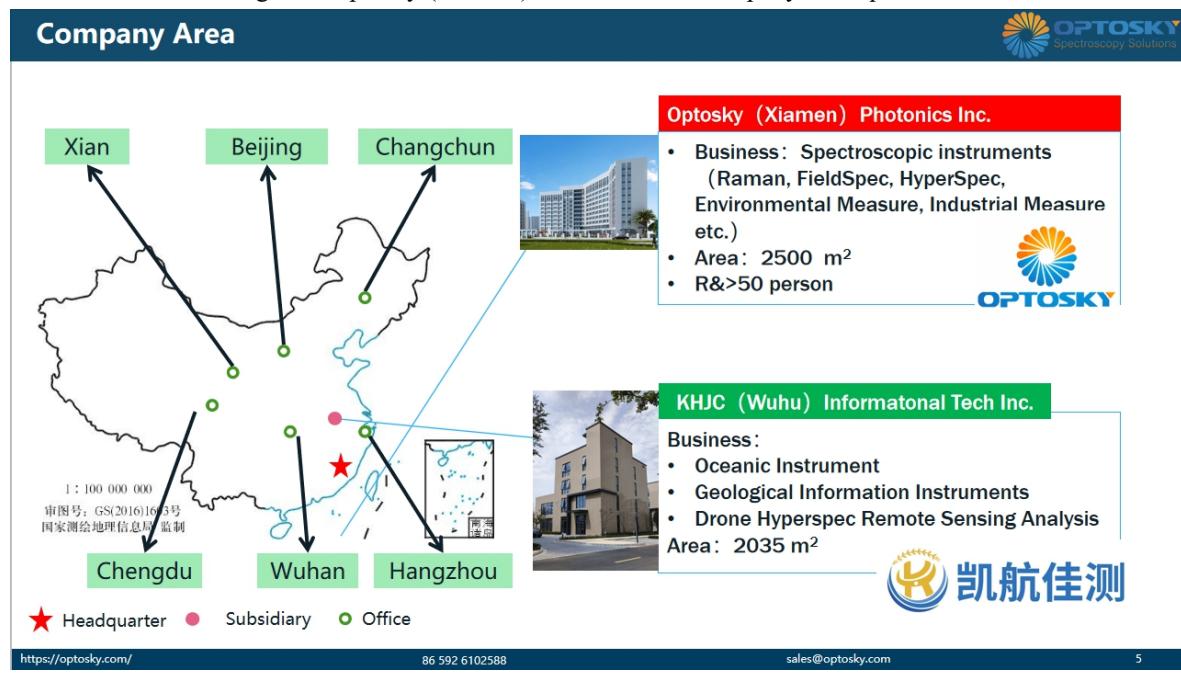


Figure 5 Optosky Company Area

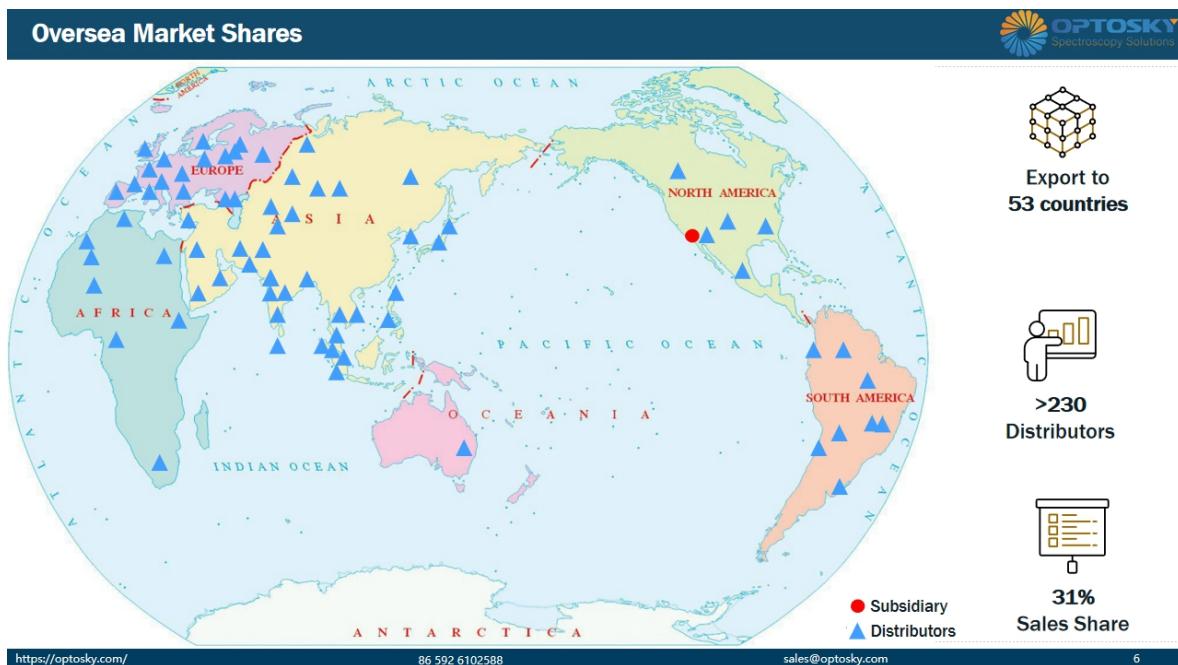


Figure 6 Oversea Market Shares

**Optosky Chair and Draft National Standards Lists:**


Figure 7 Optosky Chair and Draft National Standards Lists.



Figure 8 Qualification

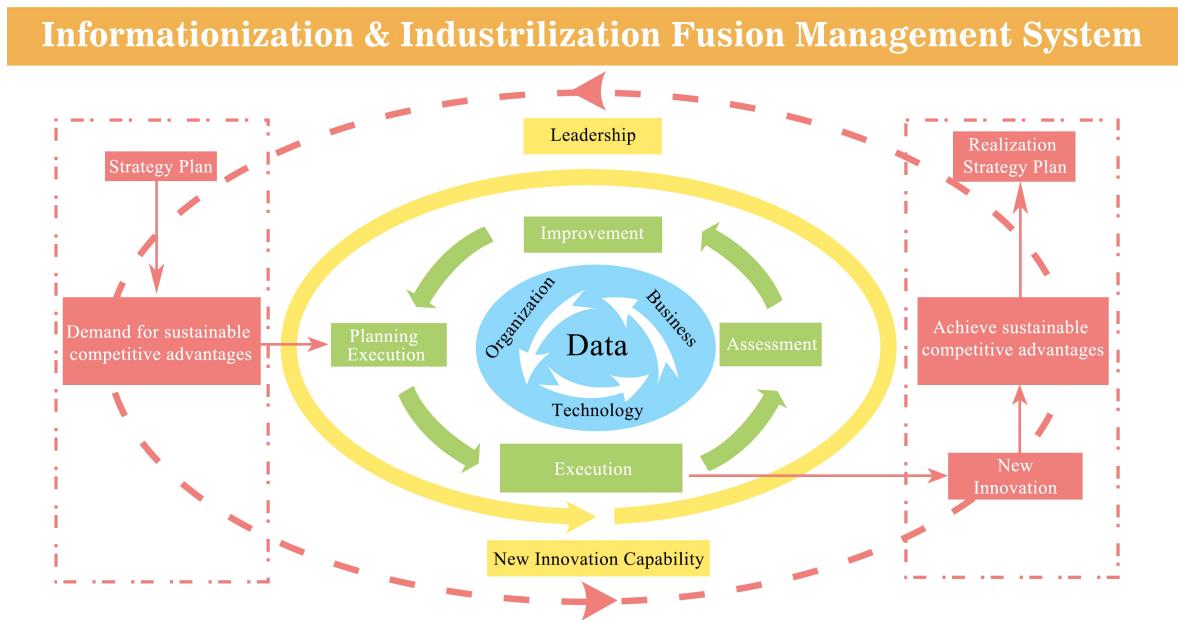


Figure 9 GB/T 23001\_Informationization &amp; Industrilization Fusion Management System

**Co-Founder—Dr. Hongfei Liu**

**Postdoctoral Hongfei Liu**

- Selected "Innovative Talent" by Science and Technology ministry
- Top Class A Talent by Xiamen City
- CCTV Science & Technology Interview
- Fortune 500 experience in Agilent, II-VI



- Selected by science & technology ministry as "Innovation Talent"
- CCTV Science & Technology Interview
- Top Class A Talent credited by Xiamen City
- Innovation Hero



- PhD • Chinese Science of Academic • Prof. Gui-Lin Chen, Originator in spectroscopy
- Postdoctoral • Xiamen University • Prof. Zhong-Qun Tian guided by the SERS founder M.Fleischmann



- Engineer → R&D Manager → GM
- Agilent**, Leader of instrument, Fortune 500 company, Job: engineer
- II- VI Incorporated (Nasdaq: IIVI) leader in optical & electrical industries, Job: GM of Instrumentation and Automation



- University graduate tutor
- obtian more than 60 IPs, more than 10 Innovation patents;
- Publish more than 20 papers, 2 recorded SCI, 8 recorded EI



Founder &amp; Tutors

<https://optosky.com/>

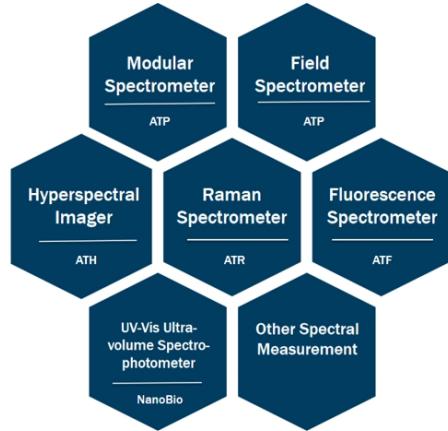
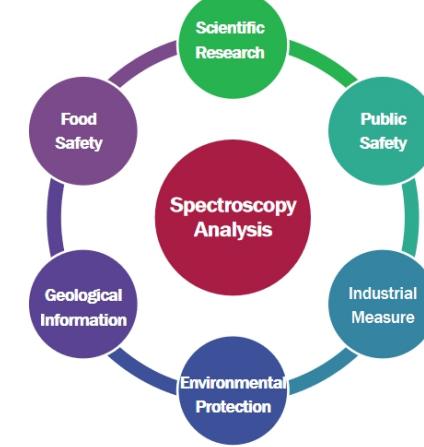
86 592 6102588

sales@optosky.com

9

Figure 10 Optosky's Co-founder\_Dr. Hongfei Liu

**Category & Application**

**Category**

**Application**

<https://optosky.com/>

86 592 6102588

sales@optosky.com

15

Figure 11 Category &amp; Application

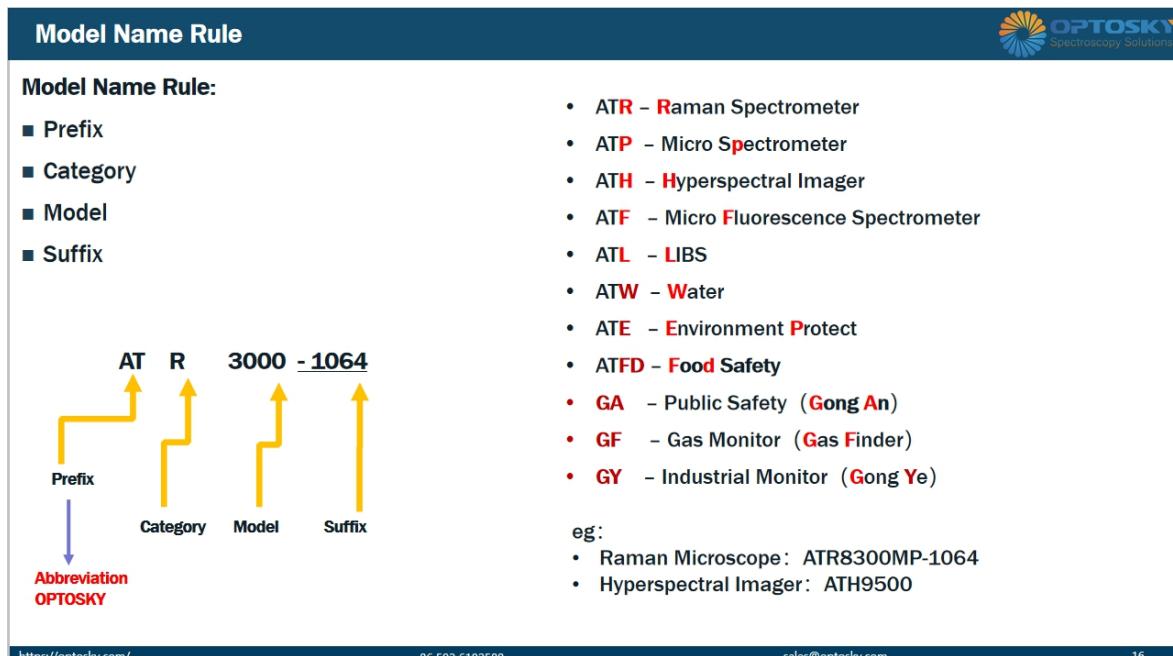


Figure 12 Model Name Rule

===== END =====