GA503JTJ
Portable Multi Parameter Hair Drugs Analyzer (Colloidal Gold)

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Feature

- **Multi-channel detection:** single or triple test card can be detected.
- **Detectable items:** Morphine, crystal meth, ketamine, etc.
- **Intelligent recognition:** Intelligent identification of control lines and test lines.
- **Spectrum analyzer:** System has a built-in standard graph curve for the detection items, which can also be added by the user.
- **Rapid test:** The determination of drug content in 100 hair samples of suspected persons can be completed in 1 hour.
- **Auto-test:** Using 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
- **Carry easily:** light weight, easy to carry, very suitable for mobile use.
- **Intelligent System:** Android operating system, intelligent data storage, processing, analysis, convenient data query and printing.
- **Built-in operation video:** Learn in one minute, speed measure in ten seconds.

Application

- Public security anti-drug
- Driving school drug testing

Description

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.

GA503JTJ portable multi parameter hair drugs analyzer, use the principle of colloidal gold immunochromatography, can 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.

GA503JTJ can choose single or triple test card, greatly improve the detection efficiency, It is equipped with standard 4G, thermal paper printing module and ID card identification module, which is suitable for the preliminary screening of drug users' hair in the laboratory by drug control departments. It can also be used for the on-site law enforcement by public security police when they go out to enter the identity information of drug users on the spot, and directly print the results as the basis for on-site inspection and disposal by public security drug control police.

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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

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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

Immunochromatography assay（ICA）is a membrane detection technology based on antigen and antibody specific immune response, has the characteristics of simple and fast operation, and is widely used in important fields such as clinical diagnosis, environmental monitoring, food safety, and drug detection. Drug immunochromatographic assay is usually performed using competitive methods, it uses strip fiber chromatography material fixed with detection line (coated antigen) and quality control line (anti-antibody) as the stationary phase, the test liquid was mobile phase, the labeled antibody was fixed on the binding pad, and the analyte was moved along the chromatographic strip by capillary action. Taking advantage of the high specificity of antibody-antigen reactions, the principle of binding specific antigens (coated antigens) to the test substance (narcotics) that may be contained in the sample through antibody competition. The reagent bar structure is shown in the figure.

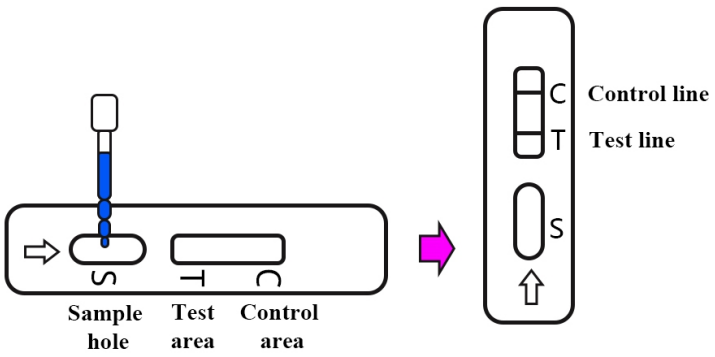


Figure 1 GA503JTJ structure diagram

Colloidal gold is a commonly immunolabeling technology, which is an immunochromatography assay that uses colloidal gold as a tracer marker for antigens and antibodies. The strip contains

specific synthetic antigens (coated antigens) that have been prefixed to the test area on the membrane, coupled to a pad containing labeled monoclonal antibodies specific to the specific drug; during the test, the sample is dropped into the detection hole, and the sample chromatographs upward under the capillary effect.

If the drug concentration in the sample is below the threshold or if there is no narcotics to be tested, the specific antibody labeled with colloidal gold cannot bind to all the drug in the sample. The remaining colloidal gold-labeled specific antibodies are bound to the coated antigen fixed to the test site (T) during chromatography, resulting in a purplish red band. If the concentration of the drug to be detected in the sample is higher than the critical value, the specific antibody labeled with colloidal gold is bound to all the drugs in the sample. Therefore, the coated antigen in the test region (T) has no specific antibody to bind to, so the purplish red band will not appear. In the quality control area (C), the polyclonal anti-antibodies are labeled, which bind to the monoclonal antibodies during chromatography to form purplish red bands, regardless of whether the drug under test is present in the sample. Therefore, the purplish red band in the quality control area (C) can determine whether the sample is sufficient and the chromatographic process is normal, and also serve as the internal control standard of the reagent.

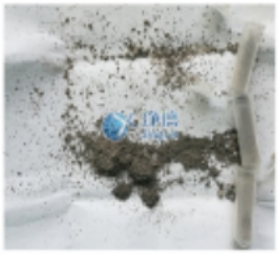
Gold immunochromatography assay is rapid, simple, stable and effective for up to 2-3 years. It has been widely used in the detection of viruses, bacteria, drugs and various proteins now. Common quick drug detection products include urine test card, saliva test card, etc., the detection time is only 5-10 minutes, which greatly promotes the popularity of this method.

GA503JTJ portable hair drug analyzer, the use of image sensor will test paper color after the image into the image information, and then the image information into digital signals, after the relevant image processing algorithm processing, get the change of image color value, so as to get the color RGB value and sample concentration relationship. Using image processing, the system can complete imaging at one time, without scanning detection and reducing detection time. Moreover, using image processing algorithm to process, it can filter out some interference from external factors and increase the accuracy of detection results. Image processing method can meet the advantages of rapid detection and anti-interference. The test can be completed within 10 minutes, easily meeting the needs of qualitative analysis and scientific research for prohibited drugs.

4. Test Process

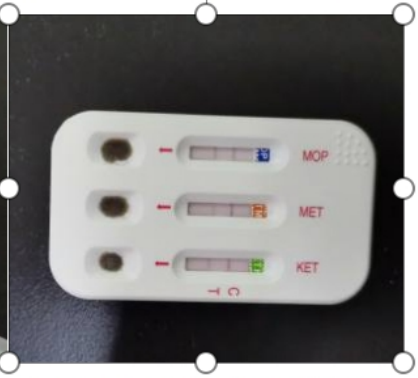
a.Hair lapping apparatus

b.Grind the hair into a powder



c.Hair drug reagent card

d.Dissolve the sample in the lysate



e.Drop into the small hole, stand for 3-5min

f. Insert it into the GA503JTJ instrument and get the result at 10s

Figure 2 GA505JTJ test process

5. Instrument 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.

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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.

6. Compared With Other Test 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

7. 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	Hair pre-treatment apparatus	1	Set	6 samples were processed at a time

8. Optional Accessories

Table 4 GA505 accessories optional

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	Ketamine	50 people / serving	0.2ng/mg
4	Meth/Morphine/Ketamine	50 people / serving	0.2ng/mg

9. Optosky Public Safety Product Line

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

10. Company Profile

Optosky company is an first-class spectroscopy solution provider, with the headquarter

locates in the 7th 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 9th 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 Docter degree from Chinese Academic of Science and postdoctral 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

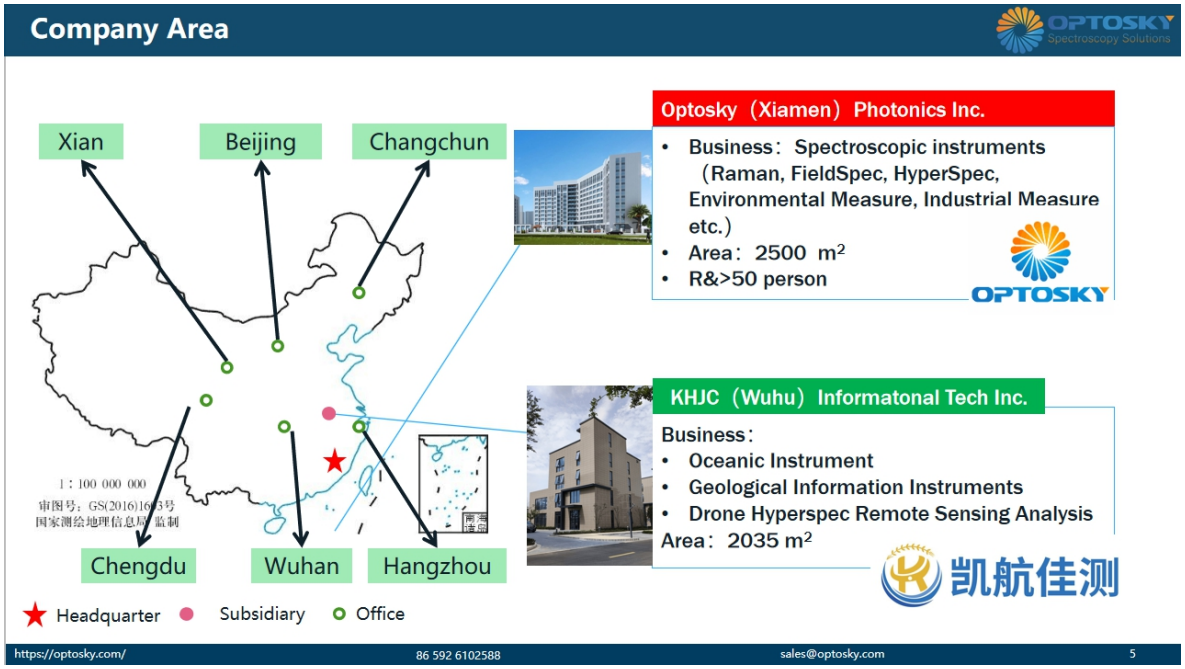

Figure 5 Optosky Company Area

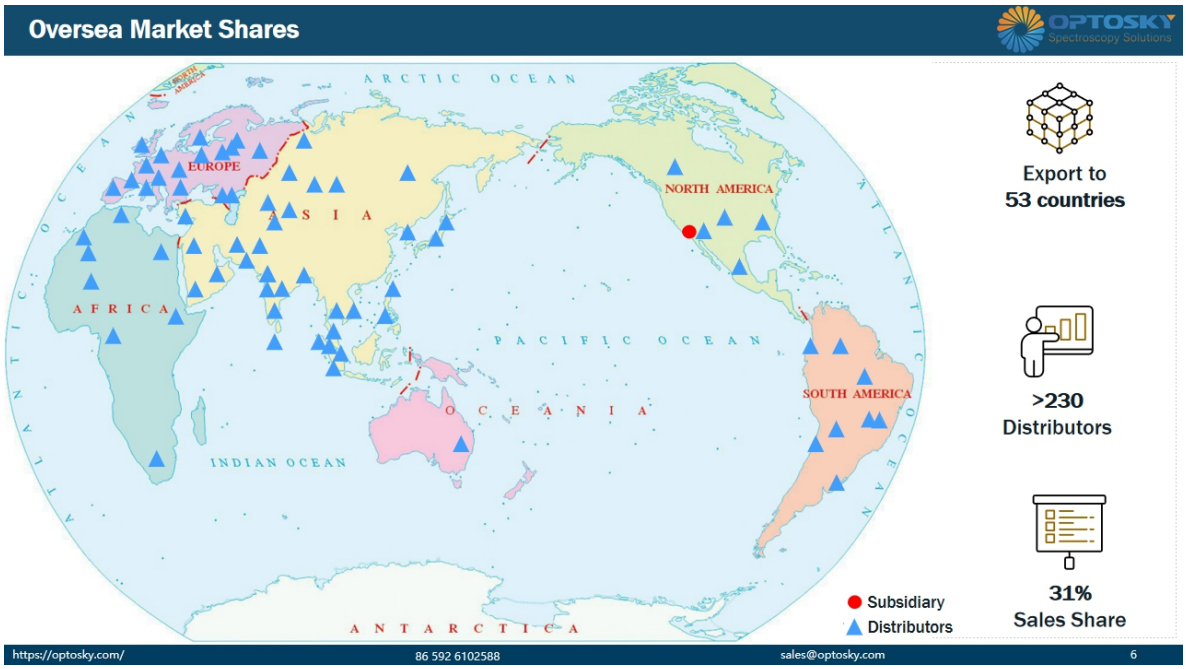

Figure 6 Oversea Market Shares

Figure 7 Optosky Chair and Draft National Standards Lists.

Figure 8 Qualification

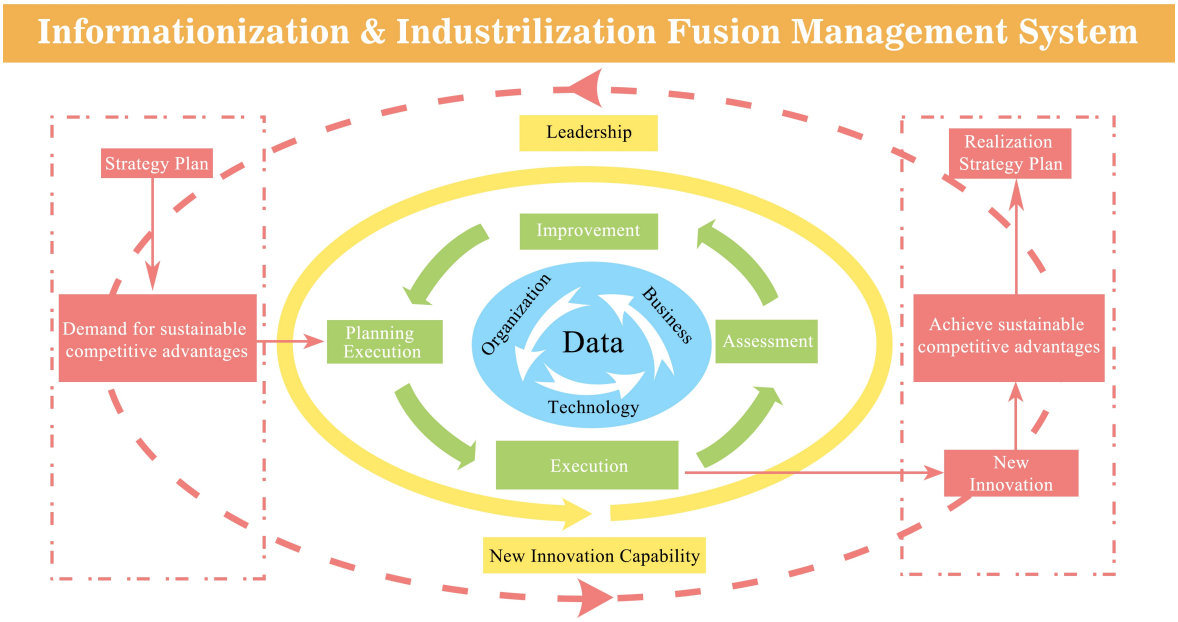

Figure 9 GB/T 23001_Informationization & Industrilization Fusion Management System

Figure 10 Optosky's Co-founder_Dr. Hongfei Liu

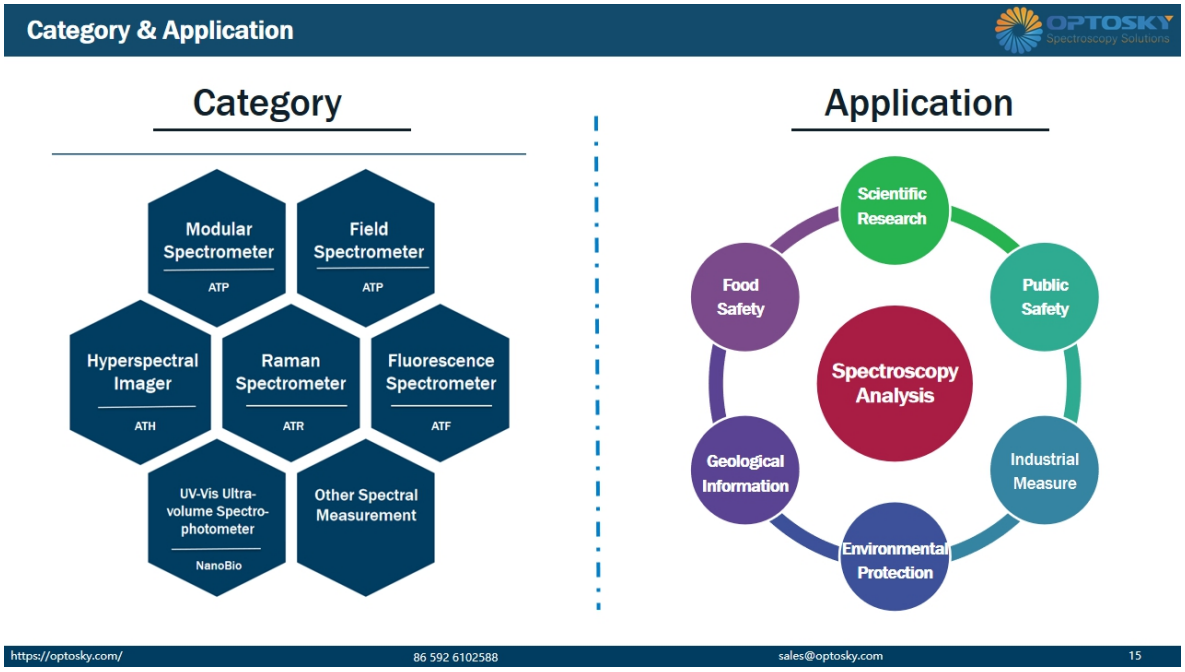

Figure 11 Category & Application

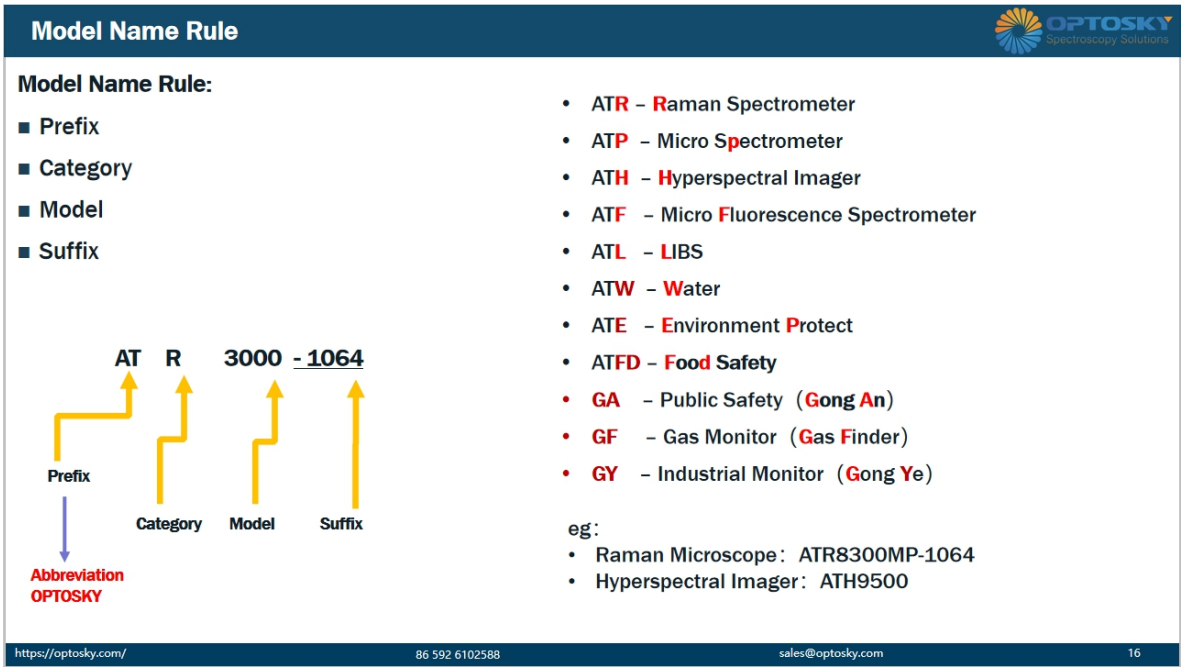

Figure 9 Model Name Rule

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