

## Discussion on the Application of Instrumental Analysis Technology in Environmental Inorganic Analytical Chemistry

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**Abstract:** Nowadays, the innovation of science and technology leads us to get rid of backwardness and move towards a new country. In the field of environmental inorganic analytical chemistry, instrumental analysis techniques are widely used. The most obvious feature of such instruments is their relatively high precision, which allows for a comprehensive study and discussion of inorganic environments. At present, there are many varieties of chemical instruments, and the scope of use is wide. Many chemical testing instruments use these chemical instruments, and fully display their value and function.

### 1. Introduction

Compared with traditional analytical instruments and analytical methods, the characteristics and advantages of modern instrumental analysis techniques are more obvious. Under relatively complex environmental analysis modes, modern instrumental analysis can better play its role. Environmental analysis contains a lot of content, such as soil testing, determining the amount of pollution in water and air, and evaluating the presence of inorganic substances in the air. There are many conditions that affect the harsh environment, so it increases the difficulty of environmental analysis to a certain extent. At that time, we should use rigorous and meticulous analysis with modern instruments to highlight the accuracy of environmental analysis [1].

### 2. Environmental analysis characteristics

#### 2.1 Diverse and cumbersome

For environmental analysis work, the sample types are many and very cumbersome, and generally they are water resources, soil resources, air resources and solid residues that are closely related to human life. Combined with data analysis, there are more than 300 air pollution sources detected, especially PCBs rank among the best in the world's environmental pollutants rankings, and are highly valued by people from all walks of life. From the relevant theoretical analysis, although there are more than 210 polychlorinated biphenyl isomers, only 102 are recognized by the state.

#### 2.2 Sample components are diverse

On the one hand, the increase in the composition of environmental media is mainly affected by the type of environmental pollutants, which comprehensively highlights the cumbersomeness of the components of environmental analysis samples. On the other hand, because environmental pollutants are up-regulated in both form and valence, this increases the amount of environmental analysis. Standing from the perspective of water source, if the natural environment changes significantly, the water source is very likely to turn from liquid to gas and solid.

#### 2.3 Environmental analysis sample components are low in content

According to the data, the content of the pollutant sample in the tested sample is low, because the content in the environmental analysis sample is not high, which reduces the efficiency of the

detection group in finding the detection component. Faced with this situation, the testing level of testing instruments should be further improved, and the testing methods should be improved to fully demonstrate the rigor and standardization of test results.

Combined with the actual situation, the core elements affecting the stability of environmental pollutants are physical properties, chemical properties and biological properties. The cumbersomeness of the sample itself and the reciprocity of the contaminants directly affect the reliability of environmental contaminants. Because the nature of environmental pollutants changes with environmental media, there is mobility in the nature of environmental pollutants. In the process of collection, storage and dispersion, environmental pollutant samples are subject to chemical reagents, increasing the probability of changes in the composition of environmental pollutant samples, thereby reducing the reliability of environmental analysis samples [2].

### **3. Differences and relationships between chemical analysis and instrumental analysis**

#### **3.1 Difference**

In the process of comparing instrumental analysis with chemical analysis, the gap between the two is still very clear [3]. In general, chemical analysis is mostly used to study constant, semi-micro, high-content components, and the accuracy is very high, and the probability of error is also very small. The professional instruments used in instrumental analysis are expensive, mainly researching trace and trace components. The advantages are outstanding flexibility, low detection limit, simple and convenient operation flow, short analysis time and easy automation. The error of the test results does not exceed the standard limit. Many instrument analyses will have errors, usually no more than 5%, and the accuracy and precision are very good.

#### **3.2 Relationship**

The relationship between chemical analysis and instrumental analysis is not independent, and the difficulty of differentiation is not great. First, the development of instrumental analysis relies primarily on chemical analysis. In many instrumental analysis methods, its class processing includes chemical analysis methods such as sample processing, sample separation, and the like. In addition, the instrumental analysis method is usually a corresponding analysis method, which must be completed by using a qualified solution in the proofreading process, and generally is performed by chemical analysis method when judging the qualified solution. Secondly, China attaches great importance to the development of science and technology. The chemical analysis method fully demonstrates the characteristics of instrumentation and automation, and is proficient in the operation process of cumbersome instruments and equipment.

Both chemical analysis and instrumental analysis promote each other and make progress together. During the period of use, they should combine their actual conditions and absorb their strengths to make up for their shortcomings and cooperate with each other.

### **4. Instrumental analysis methods in environmental inorganic analysis**

#### **4.1 Atomic fluorescence and atomic absorption**

Atomic fluorescence instrument is a kind of equipment researched and published by China. It can accurately measure metal elements in aqueous solution, and the main components of such metal elements are hydrogen compounds such as lead, antimony, selenium, tin, antimony, bismuth, antimony, arsenic, etc., the accuracy and flexibility of such elements are relatively high, so the choice of atomic fluorescence analysis, at the same time it is easy to block a series of interference from the matrix.

With the continuous use of the atomic absorption method, the method represented by the flame atomic absorption method is the first one, and the other is the atomic absorption method caused by

the hydride. Now, the graphite furnace atomic absorption method is well known. In the detection of the presence of chemical elements in aqueous solutions, the atomic absorption method is usually selected. In the analysis process, mainly trace elements and ultra-trace metal elements are mainly used.

#### **4.2 Flow injection analysis and spectrophotometry**

The process of converting a component to be tested into a colored compound in a sample is called a color reaction, and its advantage is high selectivity and sensitivity because it is frequently used. At present, the most frequently used method is the spectrophotometry, which is often used in the determination of non-metal ions and metal ions. Fusion spectrophotometric measurements and flow injection analysis, assays and chemical manipulations permeate together. The solution that has been extracted and distilled is doped with a small amount of drug, and the corresponding measurement is completed after constant volume development. This technology is widely used in laboratory testing and belongs to an automatic analysis technology, and is highly concerned in water quality testing, for example, It is detected whether or not a chemical substance such as divalent iron ions, nitrite ions, or potassium nitrate is contained in the aqueous solution.

The advantage of flow injection analysis and spectrophotometry is that the analysis can be done in a short period of time, and the accuracy of the results is very high, while the demand for drugs is not too high. In the measurement process, the spectrophotometer can be used to combine the plasma emission spectrum and atomic absorption to fully demonstrate its practicability.

#### **4.3 Ion chromatography**

Ion chromatography can be used to distinguish the anion and cation to a certain extent and complete the corresponding detection. After completing one injection, several components can be studied together, highlighting the flexibility and trade-off of chemical elements. In the analysis process, the ion mass spectrometry method can be used to detect the ions of  $Mg^{2+}$ ,  $Na^{+}$ ,  $K^{+}$  and the cation separation column and the conductivity detector can be used; and the anion separation column and the conductivity detector are used to detect  $SO_3^{2-}$ ,  $NO_2^-$ ,  $F^-$  these ions; electrochemistry is used to detect a small number of organic compounds,  $CN^-$ ,  $S^{2-}$  and  $I^-$  ions.

#### **4.4 Plasma emission spectroscopy**

The method selected in the process of detecting plasma emission spectroscopy is a plasma emission spectroscopy instrument. The advantage of using this method in the analysis step is to highlight the accuracy and flexibility, which is consistent with the accuracy and flexibility of the flame atomic absorption method. However, the detection efficiency is very high, and only about 30 elements can be analyzed in one injection [4].

#### **4.5 Plasma emission spectroscopy-mass spectrometry**

Based on plasma emission spectroscopy-mass spectrometry, plasma emission spectroscopy is based on ionization source. This method is a kind of mass spectrometry. Compared with plasma emission spectroscopy, the flexibility of plasma emission spectroscopy-mass spectrometry is higher, especially in the detection of elements with a mass of more than 100.

### **5. Application of instrumental analysis technology in environmental inorganic analytical chemistry**

#### **5.1 Quantitative analysis**

Trace elements and metal elements are the two core elements in the inorganic environment. The detection effect will directly affect the overall value of environmental science. When the test is successful, the next work plan can be drawn up. In order to accurately control the change of

elements, scientific instruments should be used to complete the corresponding operations. The ion probe analyzer is selected to test trace elements, and the isotope detection method is used to adjust the test results. The elemental analysis error is reduced with the support of modern instruments, and the X-ray spectrum can be determined for the chemical valence state of chemical elements. If the valence state changes, the degree of change in the chemical reaction and the valence state is clearly understood, and an effective chemical decision is made [5].

## **5.2 Monitoring application**

In the overall analysis, the role of chemical analysis standardization and monitoring basic research is very obvious. Combining the environmental protection conditions and element content standards, the details of the chemical operation are rationally operated, and the acquired test data is inferred, which is the implementation of the chemical overall steps. provide assurance. On the basis of modern instrument functions, the accuracy objectives of chemical experiment data are achieved. Based on the inorganic environment, comprehensively analyze and explore the material properties, and measure the important pollution component selection method. The control variables are mainly used to analyze the overall variables, scientifically measure the surface properties and sample imprints of the sample materials, and use precise and rigorous Techniques to detect the overall environment and collect samples required by the laboratory based on the overall surface properties of the material. Adding chemical reagents to integrate pollutants, so that the inorganic environment is improved.

The use of new instrument technology to extract inorganic matter from the environment and conduct research, further reduce the error between data and data, test the data in the experiment, and conduct in-depth discussion on the overall environmental variables. Accurately control the quantity of all chemical elements contained in the substance, deeper fusion theory and instruments, and implement scientific control based on material factors, environmental factors and reaction conditions under chemical reactions. In general, ion mass spectrometry is used to comprehensively describe and study ion content and chromatogram, and finally implement precise control of environmental settings.

## **5.3 Ultra-trace pollution detection**

Environmental science is a new subject. In recent years, the development speed is very fast, and the overall control of the inorganic environment is put in place. Combined with the requirements of environmental testing, the corresponding experiments are carried out to accurately control the content of pollutants and obtain detailed pollution factors. The method of physical force reaction and chemical reaction are selected to clean the environment so that the pollutant value does not exceed the normal standard.

There are many factors involved in defining the inorganic environment, and there are many factors involved, such as environment, organisms, water bodies, and food. More serious pollution will reduce the safety of the living environment to a certain extent, and the industrial pan-over is undoubtedly aggravating the social pollution situation. If the pollutants in the rainwater exceed the standard content, acid rain will form; if the pollutants in the air exceed the standard content, then smog will occur; if the lead and mercury in the soil exceeds the content, the growth rate of the crop will change. If you are slow, if you join people's diet, it will seriously harm your health. Some of the factors described above are the adverse effects that the inorganic environment may have on life. Based on this environmental protection department, when developing solutions, new instruments are needed to explain the causes of the problems, and the pollutants are all attached. Trace and ultra-trace analysis techniques are used to accurately control the super-trace contamination while analyzing the trace process.

#### **5.4 Instrument analysis of common valence of pollutants in inorganic environment**

There are many forms of chemical pollutants in the inorganic environment, and the types of analysis are also very broad. The reaction mechanism is clear and detailed, and the pollution effects produced by different environments are different [6]. Combined with the analysis of environmental indicators, the environmental values are obtained, and the environmental rectification plan is finally obtained. The pollution level is measured under the inorganic environment, the toxic substances in the pollutants are separated, and the distillation method, the extraction method and the precipitation method are selected to complete the separation task. According to the price of pollutants, a scientific environmental rectification plan is proposed to confirm the chemical pollution values in the inorganic environment.

Clearly list the different valence compounds in the natural environment, summarize the basic properties of the elements, conduct a detailed review of the performance of the sample through the laboratory, clarify the concentration value of the displayed samples, clearly grasp the chemical form and physical properties of the contaminated elements, and detect the inorganic. The stability of the pollutants in the environment and the compounds produced after the chemical reaction, to determine the nature of the chemical elements. Contaminants are significantly different in treatment methods. Some substances are purified to produce white flocs; some substances quickly become solid precipitates after chemical reaction, and the relationship between chemical structure and chemical valence is very close during the analysis. It needs to be tested with new chemical instruments and finally obtained scientific evidence.

#### **5.5 Automated continuous detection**

Nowadays, the most frequently used instrumental analysis technology in environmental inorganic analytical chemistry has an obvious automatic continuous detection function. This instrument not only can analyze, identify and research information with high quality, but also obtain effective information worldwide. The fundamental reason is that the detection instrument is very strong, and the task can be continuously and autonomously completed in the inspection process, and the measurement is continuously performed throughout the day, which greatly saves human resources and material resources and avoids wasting more time. Comprehensively demonstrate the efficiency of testing. In view of the reduction of human operation, the error rate that may be caused in the detection phase is reduced, and the accuracy of the detection result is guaranteed.

The application of new detection instruments will ensure that environmental inorganic analytical chemistry can also track all environmental chemistry worldwide, and provide a solid foundation for the transmission and movement of inorganic pollutants, while achieving continuous detection and continuous detection of targets. The effect of environmental governance is also very obvious.

### **6. Conclusion**

In summary, chemistry is closely related to human life, and it is inseparable from chemistry, whether it is food, clothing, housing, or social development. Nowadays, with the reform and changes of the times, instrumental analysis technology is widely used in environmental drone analysis chemistry. When analyzing and exploring compounds in inorganic environments, use the latest instrumental analysis techniques to obtain accurate chemical values. Based on the composition of pollutants, chemical properties, and composition, we will discuss the appropriate experimental basis and obtain scientific and rigorous chemical decisions. Instrumental analysis technology plays an extremely far-reaching role in environmental inorganic analytical chemistry, and its application effect is remarkable, and the results of chemical and inorganic research have been improved from the source. At the stage of commissioning, chemical instruments have also been further optimized to highlight the accuracy of numerical values and to enhance the degree of environmental inorganic analytical chemistry debate.

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