

Research on the Principles and Innovative Methods of Lead Zinc Ore Prospecting Technology in Geological Exploration

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Abstract:

With the implementation of China's reform and opening up, the economy has entered a stage of rapid development, at the same time, mineral resources are indispensable products in economic development, the rapid economic growth is inseparable from the support of minerals. However, in the process of mineral resources development, geological exploration plays an important role, which has certain characteristics, among which the characteristics of high investment and high risk are obvious. Therefore, the improvement and innovation of prospecting technology in geological exploration is the main driving force for mineral resource exploitation, which can not only promote the sound development of mining industry, but also effectively improve earnings. This paper studies the technical principles and innovative methods of geological prospecting for lead zinc ore.

Keywords:

Geological Exploration; Lead Zinc Ore; Prospecting Technology; Principle; Innovative Method

1 Principles of prospecting technology for lead zinc ore in geological exploration

As far as the status quo of China's mines are concerned, the depth of mining is usually more than 500 meters, but if you want to go deep mining, you will encounter certain difficulties, among which the limitations of equipment is the main factor to increase the difficulty of mining, which causes obstacles to geological exploration work. Therefore, it is necessary to adhere to the principle of prospecting technology in geological exploration, and to innovate on this basic level, so as to lay a solid foundation for the deep mining of mineral resources. In the geological exploration for aluminum and zinc deposits, the higher the technical content, the higher the requirements for instruments will increase, and the cost of instrument investment will also increase. In addition, in the exploration of aluminum and zinc deposits, all the working processes should be based on prospecting technology and methods, and the following principles should be strictly adhered to.

1.1 Principles of geological exploration target service

Geological bodies have many characteristics, which are subject to certain changes under the influence of other environments, and the influence of geological environment on geological bodies is more obvious. In geological exploration, there are regional limitations, and the exploration objects are also geological bodies that have been determined in advance. Therefore, in geological exploration of aluminum and zinc deposits, the prospecting technology should adhere to certain principles. One of the most important principles is to follow the principle of exploration service objectives, in order to decide which prospecting technology and method to use, to ensure that the geological exploration work has a clear goal, but also can effectively improve the efficiency of work.

1.2 Principles of economy and practicality

Geological exploration is a complex work, it will be affected by many aspects in the work, such as terrain, geomorphology, weather changes, etc. However, under this influence, geological exploration will encounter certain difficulties. In addition, in the process of all mineral resources prospecting, the time and energy consumed by aluminum and zinc ore prospecting is relatively high, so the geological exploration process has higher requirements for equipment. Based on this, in order to reduce the cost of prospecting, it is necessary to comprehensively consider prospecting technology, use more efficient and convenient technology

to maximize economic benefits, and improve the efficiency of geological exploration by workers on the basis of this technology. Thus the purpose of saving prospecting time and improving work efficiency is realized.

1.3 Principles of reasonable and effective exploration

As far as geological exploration is concerned, different geological conditions need different technical methods to explore, technical methods can provide different reference information for geological exploration and provide correct guidance for exploration work. Remote sensing and stream sediment measurement techniques are usually used in the exploration of aluminum and zinc ore resources. In addition, in the face of underground hidden ore exploration, the best choice is to adopt the method of surface geophysical exploration. In addition, the characteristics of exploration instruments and methods are also quite different, and each exploration method has advantages and disadvantages. Therefore, when facing the restrictions of different natural and geographical conditions, it is necessary to combine the advantages of each method to explore, make comprehensive analysis of geological conditions, and reasonably select suitable exploration technologies and methods, so as to improve the efficiency of exploration work and achieve the desired purpose.

1.4 Selection of prospecting technology and methods

In the geological exploration of aluminum-zinc ore, there are certain commonalities in the various new technologies and methods adopted, which mainly include higher requirements for related instruments, a large amount of investment in instruments and equipment, strong activity of the measured elements, strong instability, improved the difficulty of judging the ore body, and weak reaction information. When measurements are made, most of the depths measured are below a few hundred meters. Therefore, geological exploration should choose the accounting technology and method according to the actual situation.

2 Technological innovation methods for geological exploration of lead-zinc ore prospecting

2.1 The technology of "mutual restraint of geological, chemical and physical anomalies".

In the current innovation of lead-zinc ore prospecting technology, it is necessary to pay attention to the application of the technology of "mutual restriction of geological, physical and chemical anomalies". In this process, it is necessary to effectively combine with the characteristics and principles of this process, and complete the comprehensive application through complementary forms, so as to better improve the practicability of this process. Most of the application areas of this technology are deep minerals in old mines with relatively rich resources, but it is restricted by technology in the specific prospecting process. In order to better control the area and depth of long resources of hidden lead and zinc mines in private enterprises, it is necessary to strengthen the application of this technology and strengthen the precision control of deep buried data, so as to accurately explore the specific location of ore-forming structures. Therefore, in order to better ensure the quality of lead and zinc mineral exploration, it is necessary to strengthen the research and innovation of the "geological, physical and chemical anomaly mutual restriction" technology.

2.2 Combination of modern technology system

In the process of prospecting for lead and zinc ore, it is necessary to keep pace with the times and integrate with the current limited new technology, so as to improve its prospecting accuracy and overall mining quality. In this process, it is mainly reflected in the following aspects: First, because of the different characteristics of rock physics, the surface depth is defined according to this standard, and the accuracy of lead-zinc ore resources mining is defined according to the ore-forming internal law; Secondly, through the new mechanized equipment to complete the prospecting work, so as to improve the overall efficiency of prospecting; Finally, strengthen the integration of modern information technology, increase the collection and analysis of prospecting information technology, so as to better adapt to different environment of prospecting work.

2.3 GPS sensing system application innovation

With the progress of science and technology in China, GPS sensing system has been more widely used in the process of lead-zinc exploration. Through the application of this technology, the relevant signals in prospecting can be better received, monitored, analyzed and converted. In the specific application process, the stability of the absorption characteristics of lead-zinc ore is directly related to the relatively stable physical structure and chemical composition of the minerals, and under normal conditions, different minerals have characteristic radiation capabilities, so in the process of prospecting, the spectral curve can

be sampled by the spectrometer, and the measurement results are analyzed and compared with the spectrum in the resource pool, so as to achieve the purpose of identifying the structural components of the geological minerals.

2.4 X fluorescence technology

In the environment of aluminum zinc ore prospecting, it is necessary to collect the element composition and grade in the geology, and the effectiveness of this step can better improve the overall efficiency of ore prospecting. Among them, the application of X-ray fluorescence technology can not only complete the analysis of geological element composition and grade, but also has high mobility. In addition, the application of X-ray fluorescence technology has the characteristics of portability, so the application of this technology has gained more widespread attention. At the same time in the specific prospecting work to determine the effect is extremely significant. The principle of X-ray fluorescence technology is the use of photoexcitation and the material collected during the exploration, the substance will emit a certain wavelength of fluorescence after being photoexcited, the excitation wavelength is less than the emitted wavelength, and the effect is completed in a very short practice, which can fully show the characteristics of the elements through the rays, so called X-ray characteristic rays, this method is X-ray fluorescence technology. In the practical application of X-ray fluorescence technology, after a long time of practice, it is a more effective prospecting technology in the exploration of aluminum and zinc deposits, and it has many advantages, such as being able to identify the occurrence location of the ore body, the structure of the underground hidden ore, the boundary of the ore body, and the thickness of the ore layer. Therefore, the use of this technology in the actual survey can not only achieve the measurement accuracy, but also effectively improve the work efficiency.

2.5 Very low frequency electromagnetic method

With the development of economy, all walks of life have more and more demand for mineral resources. Therefore, in the long-term mining of minerals, the exposed ore and shallow ore are gradually decreasing, which increases the difficulty of exploration and prospecting. Therefore, in order to reduce the difficulty of prospecting, very low frequency electromagnetic method came into being. This method can realize the convenience of geological prospecting for aluminum and zinc deposits and meet the requirements of rapid exploration. This method is a geophysical exploration technology for prospecting. When it is applied, the relevant data should be processed in a special way, and the law of the geological material in the mining area should be comprehensively studied, and the effective combination of these methods can be used to determine the distribution in the geology, and at the same time, the space of the occurrence position of the ore body can be predicted to provide correct guidance for prospecting.

Conclusion

To sum up, China's prospecting and exploration technology continues to progress, in order to better ensure the development of lead and zinc mineral resources, it is necessary to strengthen the research on related prospecting technology, so as to rely on the relevant prospecting principles, select the corresponding prospecting technology, and better promote the development and utilization of mineral resources.

References:

- [1] Weidong Chen. *Research on Lead Zinc Ore Prospecting Technology in Geological Exploration* [J]. *Building Materials and Decoration*,2017(52)
- [2] Fang Li. *Discussion on Principles and Innovative Methods of Lead Zinc Ore Prospecting Technology in Geological Exploration* [J]. *Technology and Innovation*,2015(06)
- [3] Yunlong Ren. *Discussion on Principles and Innovative Methods of Lead Zinc Ore Prospecting Technology in Geological Exploration* [J]. *Low Carbon World*,2014(15)