Pollution and Prevention Technology of Toxic Substances in Chemical Production

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Abstract: With the continuous progress of social economy, people have improved their productivity through chemical production technology. At the same time, there are some toxic substances in the chemical production process, which have a serious adverse impact on the human body and the living environment, resulting in a series of negative situations. In view of this, this paper puts forward specific prevention and control technology by analyzing the pollution situation of toxic substances in chemical production and the existing problems. These technologies have been applied in the existing chemical production and play an effective role in prevention and control.

1. Research background

1.1 Literature review

At present, while promoting the development of agriculture and industry economy, people will pollute the environment through chemical production. In this case, social production will form certain problems. Therefore, many scholars have discussed it in detail. Some scholars have pointed out that 20 million chemicals have been synthesized in the world, but more than 80,000 chemicals are used in daily life (Xu, et al, 2018). In China, 37,000 chemical products have been produced. The production of chemicals is conducive to the convenience of people's lives and the promotion of social progress. However, due to improper use and emission, it will cause a lot of environmental pollution (Ye, et al, 2014). According to the above theory, the scholar specifically analyzed the problems in the chemical production process and put forward specific suggestions. Some scholars have pointed out that chemical substances in the production process, due to various reasons, will lead to environmental pollution, followed by property losses, personnel poisoning and other risks (Deng and Zhu, 2018). Generally speaking, there are many types of sudden hazardous events in chemical production, which seriously harm people's production and life quality. In this case, it is necessary to study the pollution of toxic substances in chemical production and to further analyze the details (Wang, et al, 2018). Some scholars have found that in chemical production, sudden toxic substance pollution has a certain threat. From the perspective of public safety, the diffusion of highly volatile toxic and harmful chemicals will lead to large-scale pollution and endanger people's lives (Wen and Wang, 2019). In this case, we need to do a good job in specific prevention work. In order to effectively prevent and control toxic substance pollution in chemical production, it is necessary to supervise and take corresponding measures through prevention and control technology.

1.2 Purposes of research

In order to effectively study the pollution situation of toxic substances in chemical production and put forward the application strategy, this paper gives technical prevention measures according to the current situation of toxic substances pollution in chemical production. There are two main sources of toxic and harmful chemicals in the environment. One is that people produce toxic chemicals to meet their own development needs, and the other is the "waste" produced and used. In order to effectively control these drugs, it is necessary to solve them through end control and process control, and with the help of technological advantages. In the existing research, few scholars have studied the pollution of toxic substances in chemical production and the prevention

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and control technology. Increasing such research is of great significance for optimizing the pollution and prevention of toxic substances in chemical production.

2. Current situation of toxic substance pollution in chemical production

2.1 Analysis of the current situation of toxic substances in chemical production

With the acceleration of industrialization, the production environment damaged by toxic substances has caused serious crisis to human health and environmental pollution. Although many comprehensive indicators of toxic organic compounds contribute less, with the accumulation of these toxic substances, major pollution accidents have occurred, and the areas of high-risk lesions have begun to increase (Chu, 2004). At present, fine chemical industry is an industry that concentrates on the production of toxic pollutants, and under the Chinese environment, the production and export of chemical products have been in the forefront of the world. Toxic substances and water environmental pollutants are mainly used in fine chemical production. Generally speaking, the production process of fine chemical industry is longer, the yield is lower, and most of the raw materials and by-products are discharged in the form of “three wastes”. In this case, in the process of chemical production, industrial wastewater is the most polluted by toxic substances, followed by three kinds of compounds with high salt content and high color. These compounds can not be biodegraded or inhibited by organisms (Cheng, 2013). In recent years, chemical pollutants are the main substances entering the environment, and have a serious impact on production and life. In chemical production activities, toxic and harmful atmospheric pollutants, soil under key control and chemicals under priority control depend essentially on risk assessment methods. However, there is a serious problem in this method, that is, little consideration is given to the inherent hazards of chemical substances, and it is impossible to screen out chemical substances with high-risk environment. This has a negative impact on the control and prevention of toxic substances in chemical production.

2.2 Prevention and control of toxic substances pollution

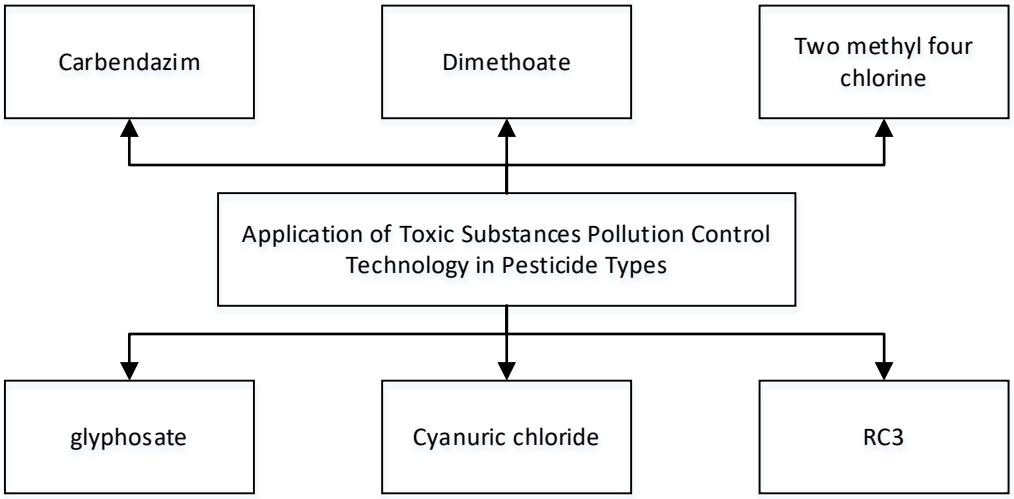
In the existing research, the problem of toxic substance pollution in chemical production is more serious. Generally speaking, chemical industrial wastewater has a complex composition, and toxic pollutants have a huge negative impact on the environment. Many studies have shown that releasing toxic pollutants from chemical production to environmental quality standards can effectively alleviate this problem (Liu and Yuan, 2010). But in fact, the effect of such emissions is not ideal. According to the actual situation, when many chemical enterprises operate this concept, it is difficult to make corresponding solutions because of the high cost of sewage discharge and the low level of their own economy. According to the calculation method of “equal standard environmental load”, it is found that at present the pollution control load of Sinopec chemical industry accounts for more than 40% of the total chemical industry in China. The main reason is that the toxic substances in chemical production pollute the environment to a high degree. When many regulatory agencies strengthen the supervision of environmental governance, the cost of governance of these small and medium-sized chemical enterprises keeps increasing, and the governance effect has been low. At the same time, volatile phenol is the main pollutant in the chemical production process, accounting for 43%; petroleum accounts for 20%, which is in a high level. In China, the proportion of COD and ammonia nitrogen under key supervision is not high, 10% and 23% respectively. In addition, based on the complex composition of pollutants in chemical industry, different types of pollutants will have different concentration indicators, which will produce different toxicity to animals and plants in the process of chemical production. The toxicity may be due to the superposition of toxic substances or the toxicity of single pollutant, which makes it difficult to analyze the toxicity of single pollutant concentration effectively. Therefore, in this case, many studies have pointed out that it is necessary to optimize the comprehensive toxicity index key, and to solve the problem by means of prevention and control technology, which is to reduce the pollution of toxic pollutants in chemical production.

3. Technical analysis of toxic material pollution prevention and control in chemical production

According to the rational production characteristics of toxic substances produced in chemical industry, toxic compounds are recovered from waste pollutants and decomposed deeply. At the same time, toxic substances were extracted and separated by catalytic hydrolysis, low-temperature oxidation and liquid membrane extraction. In the pretreatment stage of toxic substances in chemical production, more than 95% of toxic substances need to be removed. At the same time, chemical workers can also establish a number of indicators testing standards, which can be applied to the assessment of waste toxic pollutants analysis methods, in order to form a standard process of chemical enterprises. In this process, the key is to use a set of treatment technology to pretreat toxic substances before they are discharged.

3.1 Treatment type of complete set technology

Toxic substance control technology has become the key point to control toxic substance pollution in recent years. Moreover, with the formation of a number of source wastewater treatment technologies among hot pesticides and dyes, the technology has been fully applied. The design of these technologies includes the following aspects, as shown in the treatment of pesticide type in Figure 1.



Figer1. Application of Toxic Matter Pollution Control Technology in Pesticide Types

In specific applications, carbendazim, dimethoate, glyphosate, melamine and other pesticides need to be treated with control technology. In practical application, a set of pollution control technologies for toxic substances need to be further optimized. At the same time, these control technologies will also involve dyes, heterocycles and other targeted treatment technologies.

3.2 Specific processing technology system

When using prevention and control technology to deal with toxic substance pollution in chemical production, it is necessary to technicalize and process the treatment process. In other words, the prevention and control technology system mainly includes the following contents. Firstly, the extraction technology is integrated and optimized. The technology can effectively treat toxic compounds in waste, separate them from other harmful factors, and improve the separation efficiency. In terms of application, it can be applied to the treatment of toxic pollutants such as alkali salts, imidazole, phenols, morpholine and so on. On this basis, complexation extraction technology and liquid membrane separation technology can be used. These technologies can be applied in chemical production process. Secondly, catalytic thermal decomposition technology. Under suitable temperature conditions and appropriate amount of catalyst, toxic compounds in specific chemical production process can be decomposed, thereby reducing biological toxicity. Thirdly, wet oxidation technology. Under the conditions of catalyst and high temperature and high

pressure, the technology can oxidize the toxic pollutants in air and make them dissipate. Finally, the terminal processing technology is synthesized. This technology has become the main stream technology of fine chemical industry, and has been applied to the comprehensive process of chemical wastewater and waste biochemical treatment, with good results. In addition, in addition to the above technologies, other technologies can also be used in the prevention and control of toxic substances pollution in chemical production. For example, in the petrochemical field, especially in the coal chemical industry (coal-to-natural gas), pharmaceutical, fertilizer and other industries, toxic pollution control technology can be used. These technologies can provide useful reference for the removal of chemical toxic substances pollution and become a key tool for use.

4. Conclusion

With the continuous progress of social economy, chemical production plays a positive role in promoting the development of various industries. However, due to the toxic substances involved in chemical production, the emergence of pollution problems of these substances will aggravate the contradiction between human beings and the environment, which is not conducive to the sustainable development of social economy. Therefore, how to solve the problem of toxic substance pollution in chemical production and make use of prevention and control technology to improve it has positive social and economic value. Therefore, this paper attempts to analyze the technology of preventing and controlling toxic substances pollution and eliminate the pollution of toxic substances in chemical production through this technology, which is of practical significance. Moreover, the technology of prevention and control of toxic substances pollution needs to be more applied in society to promote the sustainable development of social economy.

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