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ANALYSIS OF CURRENT SITUATION ON RECOVERY OF USED LITHIUM-ION BATTERIES IN CHINA

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Abstract

The goal of this study is to analyze the recycling of lithium-ion batteries in China and their recovery value. Currently, the problem of environmental protection and recycling of waste lithium-ion batteries is facing. The resource recovery improves the circulation of material and energy. Based on a summary of the recycling and disposal technology of waste lithium-ion batteries, this paper analyzes the current situation and existing problems of recycling and disposal of waste lithium-ion batteries in China from the aspects of battery source materials, production processes, and recycling and disposal technology.

Keywords: lithium-ion battery, recovery value, recycling, waste battery, resources.

Introduction

The commonly known lithium battery is a lithium ion battery, which is recognized as one of the ideal chemical energy products in the world today due to its small size, large capacity, and high voltage. However, during the disassembly process of waste lithium batteries, heavy metals such as copper, nickel, and electrolyte will be generated. These substances entering the environment will cause serious pollution to the ecological environment. Lithium ion batteries are usually composed of heavy metals, organic compounds, and plastic components, with a proportion of approximately 5% to 20% cobalt, 5% to 10% nickel, 5% to 7% lithium, 15% organic compounds, and 7% plastic. There are slight fluctuations due to different manufacturers, and they have high recycling value [1]. If environmental protection technology is incorporated into the recycling and treatment industry of used lithium batteries, multiple metal components can be recovered and waste can be turned to resource. Every year, the world will produce about 200-500 MT of waste lithium-ion batteries [2], if these waste batteries are not effectively treated, it will cause serious pollution to the environment. As the main cathode material of lithium-ion batteries, lithium cobaltate has been widely used. However, cobalt is a kind of heavy metal salt, which can cause gastrointestinal dysfunction, deafness, myocardial ischemia and other symptoms. Combustion or decomposition of lithium cobalt oxide by heat produces toxic lithium cobalt oxide, which will cause heavy metal pollution and lead to an increase in the pH value of the environment [3]. In addition, if the separator in the used battery is discharged arbitrarily after not being effectively treated, it will bring a large amount of solid waste pollution and serious air pollution to the environment [4].

Results

On the one hand, it is widely believed in society that lithium batteries are environmentally friendly products, but in fact, the impact of waste lithium batteries on the environment is relative to other batteries. "Requirements for the Recycling and Treatment of Lithium Ion Batteries for Communications" was a national China standard issued in 2008, but the implementation effect is poor, and there is still a certain gap between the treatment technology or concept of waste batteries in developed countries in the world. For example, the European Union has already passed a mandatory recycling order for waste batteries as early as 2006, and the cost of recycling is clearly borne by the manufacturer.

On the other hand, due to the relatively strong professional nature of lithium battery recycling, the uneven cognitive level of people involved in this industry, and the lack of social science popularization, the government has not deeply recognized the pollution hazards and recycling value of waste lithium batteries. Therefore, the government should vigorously promote science popularization of this knowledge.

From this perspective, the government's participation in raising the environmental awareness of the general public on waste lithium batteries has a significant role in promoting the recycling of this industry, such as the introduction of relevant support policies, industry requirements, implementation standards, science popularization, and so on, to support the development of the battery recycling industry from the economic, policy, and other aspects [5].

Technical backwardness

The Pearl River Delta and Yangtze River Delta regions of China are the economic windows to the outside world, and are the most developed areas in the electronics industry. The recycling of waste lithium ion batteries is also mainly concentrated here. However, the technology is relatively backward, the degree of automation is extremely low, and the main reliance on manual classification and disassembly is not only prone to environmental pollution, but also low production efficiency. The waste products are mostly used batteries or electrode chips from battery manufacturers. The recycled materials are mainly valuable metals such as nickel, aluminum, cobalt, and copper. Effective recovery mechanisms, channels, and levels need to be improved and improved.

Conclusion

With the rapid development of the electronic product market, lithium-ion batteries have been widely used in commerce, with a high market share. At present, China has put forward higher requirements for environmental protection, and new energy has also been promoted. In the future, the market demand for lithium-ion batteries will only increase without decreasing, and the demand is enormous. The disposal of a large number of waste lithium-ion batteries will attract high attention from society and the government. Therefore, while strengthening government regulation, optimizing battery production processes and improving production technology, it is an inevitable trend to form a large-scale, professional, and entrepreneurial waste lithium ion battery recycling and disposal industry.

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