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ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ
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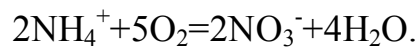
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У збірнику наведено матеріали всеукраїнської науково-практичної інтернет-конференції «Екологічно сталий розвиток урбосистем». Розглянуто сучасні проблеми урбоекології, еколого-енергетичної безпеки міст, екологічної безпеки і технологій захисту урбанізованого довкілля, екологічної освіти і трансферу знань.

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developed, namely wheat, sunflower, and corn are grown. That is, it can be assumed that the ammonium content in the Samara increases as a result of the use of a significant amount of mineral fertilizers. Regarding the decrease in its content, it can be assumed that one of the reasons for this phenomenon may be the oxidation of ammonium ions by oxygen, which leads to the formation of nitrates, which is confirmed by Figure 2.



It is also known that mine waters may contain ions of heavy metals, for example, copper, aluminum, etc. They form complex ions with ammonium, which during sample analysis do not reflect the presence of free ammonium in the surface water body. This may also be the reason for the decrease in ammonium ion content at post 2 in Figure 1.

However, for a more detailed analysis of the ecological state of the surface water body, it is rational to install additional stations for sampling.

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WASTE BATTERIES GENERATION IN CHINA

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Similarly to many other countries, China generates large amount of waste batteries. These are hazardous waste that have to be managed in specific manner [1].

Total waste batteries generation in China is estimated over 1 million tons per year [2], but this amount does not include lead-acid car batteries. Lead-acid battery refers to the electrode made of lead and its oxide, the electrolyte is a sulfuric acid solution of a battery. In 2021, China scrapped more than 6 million tons of lead batteries [2]. In the past, production mainly concentrated in Western Europe, the United States, Japan and other regions. Due to fierce competition and environmental protection, lead-acid battery factories in Europe and America reinforce trend of recent years – worldwide industrial relocation and the phenomenon of enterprise integration, further improve the production concentration. Therefore, China, Brazil, Mexico and other countries and regions at present are major batteries producers. In addition to problems such as pollution and short cycle life, lead-acid batteries have obvious advantages in other aspects, especially in terms of price. It is expected that lead-acid batteries will still occupy a large market share in the next 3-5 years, especially in developing countries.

Nickel-cadmium batteries have the advantage of being strong and cheap. Although the nickel cadmium battery is the cheapest batteries, they have the disadvantage of small capacity, life is short, memory effect, and the danger to the environment due to cadmium pollution. China has become the main production base of nickel cadmium batteries in the world. However, due to the increasing attention of environmental protection in China, the country has placed great restrictions on the production of nickel-cadmium batteries, and the export tax rebate has been cancelled. Due to toxicity of cadmium, nickel-cadmium batteries were partially replaced by nickel-metal hydride batteries, but nickel-cadmium batteries are still preferred for portable power tools.

The number of nickel-metal hydride batteries in China is about 1 billion pcs. These discarded nickel-metal hydride batteries contain 7,500 tons of nickel, 1,000 tons of cobalt and about 2,500 tons of light rare earth elements, which enter the environment and contribute to environmental pollution to some extent.

Recently, lithium-ion batteries have become the most popular. In 2021, China's theoretical waste lithium ion battery recovery volume is up to 591,000 tons, including the theoretical recovery volume of waste power battery is 294,000 tons, the theoretical recovery volume of 3C and small power waste lithium ion battery is 242,000 tons, and the theoretical recovery volume of other related waste is 55,000 tons [3].

Currently, lithium-ion batteries are the most eye-catching in the battery industry. The most widely used lithium cobalt acid battery and lithium manganese acid battery, but the industry pattern will change in the future, the lithium cobalt acid battery used

in mobile phones, computers and digital products will gradually be replaced by binary/ternary polymer lithium battery.

Waste batteries generation in China is much higher comparing to many other countries. This can result in large environmental pollution. Therefore, waste batteries management has to be improved.

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APPROACH TO THE DEVELOPMENT OF COMPLEX ENVIRONMENTAL PROTECTION TECHNOLOGY FROM THE INFLUENCE OF RECIPROCATION ICE WITH HIGH LEVEL OF WEAR

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It is a known fact that power plants (PP) equipped with a reciprocating internal combustion engine (RICE), including units of fire and rescue vehicles (FRV), are on operative duty in the departments of the State Emergency Service of Ukraine (SES of Ukraine), is a powerful source of environmental hazards.

The classification of such factors and the hierarchical classifier based on it, contains both chemical factors (emissions of gaseous substances, spills of technical liquid and solid waste) and physical factors (harmful factors – energy pollution of environmental components by thermal energy, noise and vibration, electromagnetic fields).