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PROCESSES IN OBTAINING NI NANOPARTICLES USING RAZRYADS

Tashkent State Technical University named after Islam Karimov

Alternative energy release unit

Kuchkanov Sherzodbek Kurbonovich

(associate professor of the department t.f.b.f.D PhD).

Tashkent State Technical University named after Islam Karimov

Department of alternative energy sources,

Renewable energy sources

Master of Stage 1

Parakhatov Eduard Kuatovich

Alternative Energy Sources 2nd Stage Master's Degree

Begdullaev Azizbek Rustembayevich

Annotatsiya: *Nanolazerlardan foydalanish sohasida zarrachalar olish jarayoni murakkab va ko‘p bosqichli ilmiy-texnik jarayon hisoblanadi. Razryadlar yordamida nanozarralar olish usuli nanomateriallarni yaratishda innovatsion yondashuvlardan biri sifatida keng qo‘llanilmoqda. Bu usul yuqori samaradorligi, nazorat qilinadigan o‘lchamdagi zarrachalarni olish imkoniyati va ekologik tozaligi bilan ajralib turadi. Razryadlar yordamida nanozarralar olish jarayonining asosiy tamoyillari, mexanizmlari, shuningdek, bu jarayonda yuzaga keladigan fizik va kimyoviy hodisalar haqida batafsil tahlil qilish zarur.*

Kalit so‘zlar: *nanozarralar, nanomateriallar, kondensatsiya, kimyoviy reaksiyalar, plazma, moddalar, innovatsion texnologiyalar.*

Аннотация: *В области применения нанолазеров процесс получения частиц представляет собой сложный и многоступенчатый научно-технический процесс. Метод получения наночастиц с помощью разрядов широко используется как один из инновационных подходов к созданию наноматериалов. Этот метод отличается высокой эффективностью,*

возможностью получения частиц контролируемого размера и экологичностью. Необходим подробный анализ основных принципов, механизмов процесса получения наночастиц с помощью разрядов, а также физических и химических явлений, происходящих в этом процессе.

Ключевые слова: *наночастицы, наноматериалы, конденсация, химические реакции, плазма, вещества, инновационные технологии.*

Abstract: *In the field of the use of nanolasers, the process of obtaining particles is a complex and multi-stage scientific and technical process. The method of obtaining nanoparticles using razryads is widely used as one of the innovative approaches to creating nanomaterials. This method is characterized by high efficiency, the possibility of obtaining particles of controlled size and environmental friendliness. With the help of discharge, a detailed analysis of the basic principles, mechanisms of the nanoparticle extraction process, as well as the physical and chemical phenomena that occur in this process, is necessary.*

Keywords: *nanoparticles, nanomaterials, condensation, chemical reactions, plasma, substances, innovative technologies.*

INTRODUCTION

The process of obtaining nickel nanoparticles using discharges is carried out mainly on the basis of gas discharges or plasma discharges. In this process, when exposed to an electric field, substances in the gas or vapor state are ionized and high-energy particles are formed. These particles are formed by collisions, condensation, and chemical reactions in the form of nanoscale particles. The plasma formed in the discharges, with its high temperature and ionized state, affects the surface and composition of nanoparticles, which makes it possible to control their properties. In the process of obtaining nickel nanoparticles using discharge, the main focus is on the type of discharge and its parameters. Gas discharges, especially Corona, wavelet, and controllable discharges, are widely used in the generation of nickel nanoparticles. Each type of discharge has its own physical processes and plasma properties, which play an important role in controlling the size, shape and chemical composition of nanoparticles.

MATERIALS AND METHODS

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The process of formation of nickel nanoparticles is closely related to the chemical reactions occurring within the plasma. In discharges, complex chemical reactions occur between existing gas components and additional reactants, resulting in nanoscale compounds and particles. In these processes, parameters such as gas composition, pressure, discharge voltage and frequency have a direct effect on the size and morphology of nanoparticles. Therefore, it is necessary to accurately control these parameters when optimizing the process of obtaining nickel nanoparticles. Another important factor that occurs when obtaining nickel nanoparticles using razryads is the interaction between plasma and nanoparticles. High-energy particles within the plasma form reactive sites on the surface of nanoparticles, increasing their chemical activity. As a result, new chemical compounds may appear on the surface of nickel nanoparticles or existing coatings may change. These processes are important in improving the functional properties of nanoparticles. In the process of obtaining nanoparticles, the time duration of the discharge and the frequency of repetition also play a large role.[1]

RESULTS AND DISCUSSIONS

The materials used to obtain nanoparticles using razors also influence the success of the process. Usually, metal, oxide, nitrite and other chemical compounds are obtained in the form of nanoparticles. The ionization energy, chemical activity, and interaction of each material with plasma determine the specific properties of nanoparticles. For example, copper and nickel nanoparticles have high electrical conductivity and are widely used in electronics. Oxide nanoparticles, on the other hand, are used as catalysts and photocatalysts. There are also technological problems that arise in the process of obtaining nanoparticles using discharge. The most basic problem is constant control of the size and shape of nanoparticles. Because particles in the nanoscale can significantly change their properties as a result of small changes. This requires accurate adjustment of the discharge parameters, optimization of plasma conditions and control of the chemical composition of materials. Various filtration and separation methods are also used to prevent the assembly of nanoparticles and ensure that they are uniform.[2]

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The technology of obtaining nanoparticles using razryads is widely used in scientific research and industrial production. Nanoparticles created using this method provide new opportunities in the fields of electronics, medicine, energy and materials science. For example, nanoscale catalysts play an important role in accelerating chemical reactions, while nanoparticle-based sensors have a higher sensitivity. In addition, nickel nanoparticles obtained using razryads are being used as the main component in creating new composite materials. Environmental aspects of the nickel nanoparticle acquisition process are also important. The method of obtaining nanoparticles using razryads produces less harmful emissions compared to traditional chemical methods and reduces energy consumption. This places this technology among the environmentally friendly technologies. Additional filtration and purification methods are also used to ensure that the gases and plasma content released during nanoparticle extraction using razryads are environmentally friendly.[3]

In the process of obtaining nickel nanoparticles, modern diagnostic tools are used to determine the controlled conditions and parameters of the discharge. For example, plasma and nanoparticle properties are analyzed using techniques such as optical spectroscopy, electron microscopy, X-ray diffraction. These diagnostic tools allow you to monitor the process in real time and make the necessary changes. Thus, the nanoparticle extraction process is more efficient and reliable. [4]

CONCLUSION

In conclusion, the process of obtaining nanoparticles using razryads occupies an important place in the field of modern nanotechnology. This method makes it possible to obtain high-quality, controlled-size nanoparticles and is used in various industries. To increase the efficiency of the process, it is necessary to accurately control the parameters of the discharge, in-depth study of plasma and chemical reactions, as well as the use of modern diagnostic tools. In the future, further development of this technology is expected to bring new scientific discoveries and technological advances.

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