World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-28, November 2023
ISSN: 2749-3644

CREATION OF HIGHLY EFFECTIVE X-RAY SOURCES USING NANOMATERIALS

Olimjonova Go'zal Olimjon qizi
Assistant
Tashkent medical academy, Tashkent, Uzbekistan

Article history:

Received: September 24th 2023
Accepted: October 20th 2023
Published: November 28th 2023

Abstract:

Nanomaterials and nanotechnologies are one of the priorities of the development of modern materials science. Due to the fact that it is necessary to produce devices that can prevent and reduce the negative effects of X-rays on the human body, nanomaterials are thoroughly studying and X-ray devices are created using effective methods of devices. The main components nanotechnology of this science are nanomaterials, we study its components and relevance.

Keywords: Nanofocus, Microfocus, X-Ray Tubes

Nanomaterials and nanotechnologies are one of the main fields of modern materials science development**.** Traditionally, nanomaterials are dispersed materials containing structural elements (grains, crystallites, blocks, clusters), whose geometric dimensions do not exceed 100 nm in at least one dimension and which have qualitatively and massive materials are included new properties such as functional and operational properties. Nanotechnologies include technical knowledge that enable the controlled creation and modification of nanomaterials, as well as their integration into large-scale fully functional systems.

1.1 figure. Nanotechnologies

The main components of the science of nanomaterials and nanotechnologies include: 1) fundamental research of the properties of materials at the nanometric level; 2) development of nanotechnology for both purposeful creation of nanomaterials and for the searching and using of natural objects with nanostructural elements, creation of finished products using nanomaterials and integration of nanomaterials and nanotechnologies in various industries along with sciences; 3) arrangements and methods of studying the structure along with properties of nanomaterials, as well as development of methods of control and certification of products, semi-finished products as well for nanotechnology.

The beginning of the 21st century was marked by the revolutionary beginning of the development of nanotechnology and nanomaterials. They are already used in all developed countries of the world in the most important areas of human activity (industry, defense, information technology sector, radio electronics, energy, transportation, biotechnology and medicine). The analysis of investment growth, the number of publications on this topic and the rate of introduction of fundamental and research developments allow us to conclude that the use of nanotechnologies and nanomaterials will be one of the decisive factors of scientific and economic development in the next 20 years, along with states defense development, some

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-28, November 2023
ISSN: 2749-3644

experts even predict that the 21st century will be the century of nanotechnology.

Nanotechnology is a high-tech industry that works with individual atoms and molecules along with extreme precision allows the use of the natural consequences at a qualitatively new level for the benefit of man.

Developments in the field of nanotechnology are used in almost every industry: medicine, mechanical engineering, gerontology, industry, agriculture, biology, cybernetics, electronics and ecology. Nanotechnology has a special point among other sciences. With the help of nanotechnology, it is possible to explore space, refine oil, defeat many viruses, create robots, protect nature, and create super-fast computers. It can be said that the development of nanotechnology in the 21st century will change the life of humanity more than writing, steam engine or electricity. The nanoworld is complex and still relatively under consideration, but not as far away from us as it was a few years ago.

HİSTORY OF NANOTECHNOLOGY AND İTS DEVELOPMENT

The Greek philosopher Democritus is considered the father of nanotechnology. He was the first to use the word "atom" to describe the smallest particle of matter 2,400 years ago. Swiss physicist Albert Einstein in his work published in 1905 proved that the size of a sugar molecule is approximately 1 nanometer. In 1931, German physicists Max Knoll and Emst Ruska first created an electron microscope that could study nano-objects. In 1959, the American physicist Richard Feynman announced his work that predicted the future of miniaturization. The main cases of nanotechnology were outlined in his famous lecture at the California Institute of Technology called ("There's Plenty of place at the Bottom").

Feynman scientifically confirmed that things can be created directly from atoms in terms of the basic rules of physics. At that time, his words sounded like fiction for only one reason that is the technologies that allow operations with certain atoms (that is, identify an atom, take it and put it in another place) because these kinds of operartions were not yet. In order to increase interest to this field, Feynman promised $1,000 to the first person to write a page of the book on the tip of a needle. This was done as early as 1964. In 1968, Alfred Cho and John Arthur, employees of the American Bell company's scientific department, developed the theoretical basis of nano-processing of the surface. In 1974, the Japanese physicist Norio Taniguchi introduced the word "nanotechnology" to the list of scientific terms, he used this word to describe mechanisms with dimensions smaller than 1 micron, and in 1981, the German physicists Gerd Binnig and Heinrich Rohrer created a scanning tunneling microscope, this equipment can affect at the atomic level. They have won the Nobel award 4 years later. In 1985, American physicists Robert Kerl, Harold Croteau and Richard Smalley created a technology that can accurately measure objects with a diameter of 1 nanometer. In 1986, unlike the tunnel microscope, an atomic force microscope was created that could interact with all materials.

In 1986, nanotechnology became known to the general public. American futurist Eric Drexler published a book predicting the rapid development of nanotechnology in the near future. In 1989, IBM employee Donald Eigler wrote his company's logo with xenon atoms. In 1998, the Dutch physicist Seez Dekker created a nano transits.

In 2000, the US government announced the "National Nanotechnology Initiative" and 500 million US dollars were allocated from the US federal budget. In 2002, this amount was increased to 604 million dollars along with 710 million dollars by 2003. In 2004 the US government allocated 3.7 billion dollars for 4 years to research in this field. In general, all over the world 12 bln. dollars were amounted to study this field! In 2004, the US government supported the "National Nanomedicine Initiative" as part of the National Nanotechnology Initiative. Rapid development of nanotechnologies arose from the public's need to cover a large amount of information. Modern silicon chips (integrated circuits) continue to get smaller due to various technical requirements until about 2012, when electrons begin to pierce the passageways in transistors due to the tunnel effect. This means a short circuit. To overcome this, instead of silicon, carbon nano chips with dimensions of several nanometers could be obtained. Currently, great research is being conducted in this direction.

NANOMEASUREMENTS IN MEDICINE

It is known that when a substance changes from the macro scale to the nanoscale, its properties change dramatically.

The changes are related to two main reasons:

1. increase in surface area
2. to the change of electronic structure due to quantum effects

The properties of atoms located near the surface differ from the properties of atoms located in the volume of the material, so the surface of the material can be considered a special state of matter [1-10]. The more surface atoms there are, the stronger the surface effects are.

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-28, November 2023
ISSN: 2749-3644

The special properties of the electronic structure of nano-objects are explained by the increase of quantum properties due to the decrease in size. Nanoparticles: particles with a size of less than 100 nm, composed of 106 or less atoms, and their properties are those of the same atoms differs from the properties of the bulk substance it is made of. Nanoparticles smaller than 10 nm in size are called nanoclusters. The word cluster comes from the English word "cluster" - a bunch, a heap.

There are up to 1000 atoms in a nanocluster usually . Many laws valid in macroscopic physics (macroscopic physics "works" with objects much larger than 100 nm) do not work for nanoparticles [6-9].

Nanotechnology is technologies that operate on the nanometer scale. This is an insignificant value, less than a hundred times the wavelength of visible light and comparable to the size of atoms. The development of nanotechnology is carried out in 3 directions such as:

1. Production of electronic circuits in the size of a molecule (atom)
2. Design and production of machines;
3. Manipulation of atoms and molecules;

Basically, nanotechnology makes it possible to create absolutely any object by manipulating individual atoms of matter. Nanotechnologists are developing methods of building materials with certain properties from these parts, considering individual atoms as parts. Many companies already know how to assemble atoms and molecules into some kinds of structure.

According to the canonical definition of R. Freitas, a leading scientist **in the development of nanomedicine, nanomedicine** is: "Observation, repair, design and control of human biological systems at the molecular level, using developed nanotechniques and nanomovements" [10-15]. Thus, the prospect of using nanotechnology in medicine is ultimately the need to change the structure of the cell at the molecular level with the help of nanorobots or other nanotechnologies.

CONCLUSİON

Detailed information on the modern materials science of nanotechnology is given along with nanomaterials, which are currently being used for X-ray devices in the field of medical engineering, are thoroughly discussed. Regarding the study of nanotechnology and the history of its development, the classification of nanoscales, nanomaterial structures, foundations and nano sources of X-ray devices are presented in medicine. The role of micro focus radiography in medical research, i.e., the physical parameters that need to be considered in the application of nanomaterials for their high-effictive sources in modern X-ray devices.

REFERENCE LIST:

1. Андриевский Р.А., Рагуля А.Б. Наноструктурные материалы. - М.: Академия, 2005. 192 с.
2. Лякишев Н.П., Алымов М.И. Наноматериалы конструкционного назначения // Российские технолгии. 2006. Т. 1. № 1-2. С. 71-81.
3. Цветков Ю. Термическая плазма в нанотехнологиях / www.den-za-dnem.ru. 27.11.2007. Грант Президента РФ НШ-1895 2003.3.
4. Валиев Р.З. Создание наноструктурных металлов и сплавов с уникальными свойствами, используя интенсивные пластические деформации // Россиские нанотехнологии. 2006. Т. 1-2.
5. Таубин М.Л., Платонов В.Ф., Ясколко А.А. Катоды медицинских рентгеновских трубок // Медицинская техника. 2009. № 1 (253).
6. Валуев Н.Н., Куликов Н.Н., Кочетков М.Д., Таубин М.Л. Металлокерамическая рентгеновская трубка для маммографии // Медицинская техника. 2005. № 5 (251).
7. Таубин М.Л., Платонов В.Ф., Ясколко А.А. Катод прямого накала и способ его изготовления / Патент РФ № 2 314 592C1 2006.
8. Carbon nanotube field emission array and method for fabricating the same. US Patent № 6,440,761, 2002.
9. Елецкий А.В. // Успехи физических наук. 1997. Т. 167. № 9. С. 945-972.
10. Золотухин И.В., Калинин Ю.Е. Замечательные свойства углеродных нанотрубок // Природа. 2004. № 5.
11. Heo S.H. et al. X-ray tubes with carbon nanotubes cathode // Appl. Phys. Lett. 2007. 90. 183109.
12. Sugie H., Tanemura M., Filip V. et al. Carbon nanotubes field-emission cathode // Appl. Phys. Lett. 2001. Vol. 78. 2587.
13. Senda S., Sakai Y., Mizuta Y., Kita S. and Okuyama. Surer - miniature X-ray tube // Applied Physics Letters. 2004. Vol. 85. № 3.
14. Zhan J. et al. Stationary Scanning X-ray source based on carbon nanotube field emitters // Applied Physics Letters. 2005. Vol. 86. 184104.
15. Добрецов Л.Н., Гомоюнова М.В. Эмиссионная электроника. - М.: Наука, 1966.
16. Рахимов А.Т. Автоэмиссионные катоды

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-28, November 2023
ISSN: 2749-3644

(холодные эмиттеры) на нанокристаллических углеродных и наноалмазных пленках (физика, технология, применение) // Успехи физических наук. 2000. Т. 70. № 9. С. 996-999.