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SCIENTIFIC ACHIEVEMENTS OF ACADEMICIAN SAYORA SHARAFOVNA RASHIDOVA IN THE FIELD OF CHEMISTRY AND PHYSICS OF POLYMERS

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Abstract:

The article is devoted to the scientific achievements and developments of Academian Sayora Sharafovna Rashidova. In particular, the article highlits the innovate inventions and patents of Academian Rashidova, The article consist of five parts: introduction, literature review, results and conclusion.

Key Words: Inventions, Patent, Innovation, Development.

INTRODUCTION.

Much attention has been paid to the development of science since the first days of Independence of the Republic of Uzbekistan, as evidenced by the reforms that have covered the field of research activities in order to further strengthen the scientific and technical potential of the country. Thus, in Uzbekistan, women are increasingly taking leading positions in all spheres of activity. They make a significant contribution to the development of education, culture and science. Uzbek women scientists have shown themselves in the field of chemistry, biotechnology, agriculture and many other spheres [1] Their intellectual work is highly appreciated by foreign scientific centers. 660 women doctors of sciences, 6 academicians work in the scientific and educational institutions of the republic. In scientific institutes at the Academy of Sciences of Uzbekistan, about 3 thousand women are fruitfully conducting research activities [2]

LITERATURE REWIRE

Considering the degree of study of the topic, it is necessary, first of all, to dwell on the cycle of bibliographic data Shamansurov O.A., Klicheva O.T, which presents the biographical data and scientific research of academician S.Sh. Rashidova. The brochure of the Institute of Chemistry and Physics of Polymers makes it possible to carry out a comparative analysis of material archaeological sources and thereby provide information about the scientific achievements of S.Sh. Rashidova.

RESEARCH METHODOLOGY

The methodology for writing this article is based on the principles of independence and the concept of a civilizational approach to the historical process. Also, speaking about the methodology of the article, I would like to emphasize that we used the methods of selection and classification of material, comparative analysis of the given facts.

ANALYSIS AND RESULTS

Sayora Sharafovna Rashidova - Doctor of Chemistry, Professor, Academician of the Academy of Sciences of the Republic of Uzbekistan, Honored Scientist of the Republic of Uzbekistan, founder and director of the Institute of Chemistry and Physics of Polymers of the Academy of Sciences of Uzbekistan. Sayora Sharafovna Rashidova belongs to the galaxy of scientists with bright creative abilities, extensive and deep knowledge, rich practical experience, and organizer talent.

For 50 years of scientific activity, Academician S.Sh. Rashidova has published over 1000 scientific papers, including over 50 inventions and patents. 6 doctors of sciences, 21 candidates of sciences, 4 doctors of philosophy (PhD) were trained under her leadership. The research results of S.Sh. Rashidova were repeatedly reported at international symposia, conferences, seminars held in countries such as France, USA, Poland, Hungary, India, China, Czechoslovakia, Turkey, Canada, Germany, Ireland, Russia, Kazakhstan, Ukraine, The Netherlands and were highly appreciated by specialists.

Sayora Rashidova was born on August 2, 1943 in the city of Jizzak, in the family of a prominent State and political figure, Sharaf Rashidov, who was also a famous writer, candidate for membership in the Politburo of the CPSU Central Committee and First Secretary of the Central Committee of the Communist Party of Uzbekistan, Rashidov Sharaf Rashidovich and Rashidova Khursand Gafurovny.

After graduating from school in 1960, Sayora Sharafovna studied at the Faculty of Chemistry of Moscow State University from 1960 to 1965. M.V. Lomonosov, and graduated from the Department of Chemistry of Macromolecular Compounds. After graduating from the University in 1965, she was sent to work at the Institute of Chemistry of the Academy of Sciences of the Uzbek SSR as an intern-researcher, completed a 2-year internship at the Institute of Petrochemical Synthesis named after Topchieva A.V. Academy of Sciences of the USSR. In 1971, having successfully completed her postgraduate studies, Sayora Sharafovna defended her thesis for the degree of candidate of chemical sciences on the topic "Research of polymerization and copolymerization of propargyl esters of α, β unsaturated acids with N-vinyl lactams". In 1983, at the Moscow State University. Lomonosova Rashidova successfully defended her thesis for the degree of Doctor of Chemical Sciences on the topic: "Synthesis, properties and application of metal complexes of polymers of vinyl lactams and propargyl ethers of unsaturated acids", and in 1984 she was awarded the title of professor. In 1994 S.Sh.Rashidova was elected a Corresponding Member of the Academy of Sciences of the Republic of Uzbekistan for achievements in the development of chemistry, physics and technology of polymers of natural and synthetic origin, and since 2001, Academician of the Academy of Sciences of the Republic of Uzbekistan, specializing in "Chemistry of Macromolecular Compounds".

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An important section of research in the field of the synthesis of biologically active polymers in the activities of Academician S.Sh. Rashidova is the production of polymer polymer systems based on water-soluble natural and synthetic polymers. On the basis of these studies, ideas were developed about the compatibility of polymers at various hierarchical levels, molecular and supramolecular. As a result, assumptions were made about the formation of nanoscale polymer systems.

For the first time by Academician Rashidova S.Sh. with colleagues applied the methods of the interdisciplinary science of synergetics for the theoretical substantiation of the action of biologically active polymers as environmentally friendly polymer pesticides used in the pre-sowing preparation of seed for agricultural crops using the encapsulation technology.

Another area of theoretical research is the theoretical study of the relationship between structure and properties based on the use of the QSPR-modeling method. By solving this problem, it was possible to understand the nature of the homology of a number of polymer systems. The concept of adaptive materials science has been put forward, the essence of which is to obtain biologically active polymers with new physicochemical properties when exposed to UV and other types of radiation on genetic material. All these developments of theoretical models contributed to the formation of a number of problems, the solution of which is important for a new direction of science - nanophysics and nanochemistry.

S.Sh. Rashidova and the team of employees own priority research on the creation of polymer hydrophilic coatings for agricultural seeds. They were the first to develop the concept of using polymers in seed science, formulated the physicochemical, ecological, biological and technological principles of creating polymer systems for the immobilization of biologically active compounds used in crop production. The concept of creating polymer systems for greening crop production is implemented in the technology of pre-sowing preparation of cotton, rice, sugar beet seeds by encapsulation.

The formulated physicochemical and biological principles of creating biologically active polymer systems formed the basis of international cooperation with the firms "Rhône-Poulenc" (France) and "Sandoz" (Switzerland) on the program of biological evaluation of pesticides when used for seed encapsulation. [3]

For a number of years, under the leadership of Academician S.Sh. Rashidova, fundamental research has been carried out on the synthesis of polymer-silica sorbents for HPLC and HPTLC. This direction of scientific research has received a new impetus in connection with the use of nanotechnology. In collaboration with prof. B. Kabulov was the first in the Republic to synthesize nanohybrid polymer-silica materials using sol-gel technology in one stage. The resulting nanosorbents have different functionalities and can be used not only as highly selective sorbents for chromatography, but also as nanofillers to obtain composite materials of improved quality. The research results were recognized by leading scientists of foreign countries. [4]

These polymer systems relieve chemical stress in the ecosystem of the Republic of Uzbekistan, are adaptogens of plants in an arid climate, contribute to a decrease in the incidence of agricultural crops and an increase in productivity. These developments of the institute are widely implemented in the agro-industrial complex of Uzbekistan.

The seed encapsulation technology was highly appreciated at the 26th International Exhibition on Intellectual Property held in Geneva (Switzerland) in 1998 and was awarded a bronze medal. [5] An important practical area of activity of Academician S.Sh. Rashidova is deep research on the production of polymer products from waste products of the Republic of Uzbekistan, in particular, juice production, natural silk production, cotton ginning industry. In this regard, the technology of extracting pectin substances from juice production waste and obtaining, on their basis, medicines for the prevention and treatment of acute gastrointestinal diseases, food additives, nutrients for microorganisms that are used in biotechnological processes has been optimized.

Entero- and hemosorbents of silkworm pupae were obtained from the waste of natural silk production, in particular the fibrous part, a technology for producing pupal oil was developed, which is planned to be used as surfactants, as well as in perfumery and cosmetics. In addition, a technology has been developed for the production of chitins and their

derivatives, in particular chitosans with varying degrees of deacetylation and polymer metal complexes for the purpose of their use in agriculture, pharmacy, etc. [6]

One of the priority fundamental studies of academician Rashidova S.Sh. are research in the field of polymer physics, the study and establishment of a number of theoretical laws of synthesis and properties of electrically conductive polymers with special properties, computer modeling of the dependence of polymer properties on molecular parameters. The performed theoretical studies and the results obtained turned out to be fruitful and useful in the interpretation of a number of regularities, in particular, the correlations composition - structure - properties of polymers, in the theoretical substantiation of the formation of nanostructures in polymer systems. [7] On the initiative and leadership of S.Sh. Rashidova, a pilot production was created at the institute where technologies for the production of a new natural polymer of chitosan, which can be used in many sectors of the economy, were mastered, and on its basis the domestic drug UzKhitAN - a polymer dressing agent with a stimulating effect. In addition, research is being carried out to develop a technology for the production of water-soluble, high-viscosity carboxymethyl cellulose from cotton lint for the needs of the gas and oil refining industries and hydrometallurgy, the production of the Polydef polymer defoliant, the production of which has been mastered on the basis of LLC Carbonam and Fergana-nitrogen. [eight]

Recently, of particular interest is the preparation of nanostructured polymer metal complexes based on chitosan and its derivatives, since comparative experiments show that nanoscale systems of this class of polysaccharides are characterized by a very pronounced biological activity.

CONCLUSION/RECOMMENDATIONS

Since the beginning of the 21st century, it has been difficult to find industries in the multifaceted production activity of a person that do not use polymer materials. A new round in the development of polymer science towards the creation of modern polymer materials in recent years is associated with nanostructured polymer materials. The development of nanotechnologies and the creation on their basis of new polymer materials with predetermined properties is today one of the most promising areas of fundamental and applied science all over the world.

The relevance of deepening research in the field of nanotechnology is especially evident today, when the economies of most countries of the planet are experiencing the negative impact of the global financial and economic crisis. One of the most important tasks implemented in Uzbekistan at the initiative of the head of state of the Anti-Crisis Program of Measures is the development of an innovative economy, technical and technological re-equipment of its leading industries, in particular, the corresponding restructuring of the chemical industry.

One of the first in the Republic of Uzbekistan, under the leadership of Academician S.Sh. Rashidova, scientists from the Institute of Chemical Physics and Problems of the Academy of Sciences of the Republic of Uzbekistan began to work actively in the field of nanotechnology. [9] The development of this new scientific direction at the institute is far from accidental, since recent studies have created a certain groundwork in the field of theoretical research and experimental work related to the study of macromolecules from the standpoint of their hierarchical structure, which determine self-organization under the influence of external factors, the synthesis and modification of natural and synthetic polymers, the creation of polymer-polymer mixtures with biological activity, and also nanostructured composite polymer materials, which made it possible to logically proceed to research in the field of nanochemistry of polymer systems.

So, from 2000-2003. research has begun to identify ways to create a new generation of nanopolymer materials by studying the mechanisms of the formation of nanostructures in polymer systems, their stabilization, establishing a connection between synthesis, structure and properties.

It is safe to say that academician Rashidova S.Sh. is a worthy successor of the founder of polymer science in Uzbekistan, academician Usmanov Kh.U. and the team of the institute headed by her is committed to the implementation of topical priority scientific programs that solve the problems of economic and social development of the country, the entry of the Institute of Chemical Physics and Problems of the Academy of Sciences of the Republic of Uzbekistan to the forefront of the development of the world science of polymers. [10]

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