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STUDY OF SILICON IN THE INTRODUCTION

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ABSTRACT

The article states that many studies in silicon physics have been conducted on silicon. In particular, some elements of the periodic system in silicon were incorporated and the results obtained from it and some aspects of the application of these results in various fields of science and technology were considered.

Key words: Silicon, inlet, element, deep surface, photoconductivity, lamination.

INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

Semiconductor devices, equipment, and equipment in industry, agriculture, transport, electronics, microelectronics and electronics, computers, energy conversion (particularly in solar energy), communication, information, household services and all other areas of society. - The district performs important tasks.

In our country serious, effective scientific and practical research is conducted at the level of world science in the field of semiconductor devices physics in the institutes of the Academy of Sciences and laboratories of universities. The most commonly used material in the production of semiconductor devices and systems is silicon. Analysis of studies in the field of semiconductor physics shows that many studies have been conducted on silicon. In these studies, most elements of the periodic system were incorporated into silicon, and different results were obtained. The following table lists the elements included in the silicon and the results it contains.

Table 1

Name of the item	The results obtained
Boron	The method of increasing the coefficient of admixtures introduced in German and silicon at different temperatures and on the basis of heating was determined.
Phosphorus	When the high P + ions were implanted, the effect of the silicon-restricted zone was observed. This phenomenon is explained by the formation of a new zone in the implantation of the P + ions with the thickness of the donor layers at 0.2–0.3 eV and joining to the superconducting zone.
Sulfur	Measurement of the temperature dependence of the Hall coefficient on sulfur-bearing silicon sample indicates that sulfur silicon forms two donor layers. After introducing the sulfur into P-Si, the specific resistance was 103-105 Om cm at 3000 K.
Scandium	After applying the scandium to silicon, E1 = Ec− (0.5 ÷ 0.2); E2 = E2−0,27; E3 = Ec − 0.35; E4 = Ec− (0.5 ÷ 0.55); Deep levels with ionization energy E5 = Ev + 0.45 eV are generated.
Titanium	It was found that titanium silicon generally produces two deep energy levels, ie ionization energy of Es-0.27 eV and Ev + 0.3 eV.
Vanadium	In vanadium samples, the ionization energy of n-type silicon is three, namely Ei = Ec-0.21; Ei = Ec-0.32; Ei = Ec-0.52 eV, and p-type

	specimens are four Ei = Ev + 0.52; Ei = Ev + 0.42; Ei = Ev + 0.31; Ei = Ev + is shown to form deep layers with 0.26 eV. The concentration of these surfaces, the values of the photon and current transmittance cross sections were experimentally determined.
Chromium	Measurement of the temperature dependence of the Hall coefficient on a chromium-containing silicon sample shows that chromium forms two layers.
Manganese	The technological regime of silicon samples, manganese-legged. Recovered auto-vibration parameters allow for a large amplitude current of I = 300 mA, infrared frequency f = 10-3 ÷ 10 Hz, and a 100% modulation material.
Iron	After the introduction of iron into silicon, the spectrum of photochemistry and induced photochemistry were studied. These compounds have created deep levels in the silicon-restricted area.
Cobalt	Cobalt mixtures form deeper layers in silicon. The measurement of the photo shows that the layers in the cobalt silicon are characteristic of thermal treatment. The velocity of the silicon fusion does not affect the deep levels.
Nickel	After the introduction of nickel in the n-Si, the specific resistance was 103-105 Om cm at 3000 K. The nickel was inserted into p-Si to measure the photoconductivity at 770K and 4.20 K.
Copper	The mixture of copper formed deep layers in silicon.
Zinc	After zinc injection, the relative resistance was 103-105 Om cm at 3000 K. After the introduction of zinc into silicon, the photo spectrum and induced photochemistry were studied. These compounds have created deep levels in the silicon-restricted area.
Selenium	Measurement of the temperature dependence of the Hall coefficient on the sample of silicon with selenium mixture shows that selenium silicon forms two donor layers.
Yttrium	The n-type silicon of the rare earth elements investigated was characteristic of the receptor. The values of diffusion parameters of all rare earth elements were found to be specific to the III group elements of the periodic system of elements of DI Mendeleev.
Rhodium	The decrease of μ with increasing concentrations of Rh centers in the compensated n-Si <P, Rh> samples was explained by the increase in G.
Palladium	The conductivity of silicon in the palladium mixture was investigated and the parameters of these compounds were determined.
Tin	The additional tensose sensitivity in the silicon embedded in the tin is due to the internal mechanical voltage that is formed in the silicon volume of the tin joints.
Barium	When the Ba + ions were implanted, the effect of the silicon-restricted zone was observed. This phenomenon is explained by the formation of a new zone in the implantation of the β + ions, with the thickness of the donor surface being 0.2–0.3 eV and joining to the superconducting zone. When β + ions are implanted, a zone in which the receptor layers are deposited is attached to the valence zone.
Rhenium	The photoconductivity of rhenium silicon was investigated and the parameters of these compounds were determined.
Osmium	Silicon oxide enrichment has different electrical conductivity and allows for high-throughput photosensitive material. It has been observed that neutrons up to 1015 cm2 integral flow can withstand g-radiation up to 5 • 1018 cm2 flow and with temperatures up to 8000C.
Iridium	Stability of the Iridium center to a temperature of 6000C is established. The distribution of active energy to each center is calculated. The effect

	of the rate of corrosion on structural defects of silicon, which is legidated with iridium, has been studied.
Platinum	Platinum compounds have formed deep levels in silicon. The measurement of the photo shows that the platinum levels in the platinum are characteristic of thermal treatment. The velocity of the silicon fusion does not affect the deep levels.
Gold	After gold injection into p-Si, the specific resistance was 103-105 Om cm at 3000 K.
Mercury	The temperature dependence of the diffusion coefficient of mercury on silicon was determined. The electrical, photoelectric and thermophysical properties of silicon, which are included in mercury, have been studied.
Radiy	The effect of radiation atoms on the thermal conductivity of silicon over a wide range of temperatures was studied. The appearance of additional heat conductivity has been observed and it is established that this conductivity is related to the nature of the mixture.
Gadolinium	When gadolinium atoms are introduced into silicon by diffusion, the formation of four deep layers is determined by complex methods.
Samaritan	In silicon, which is legioned with Samaria, four deep layers are formed.
European	During the cultivation, two deep layers are formed in silicon,
Erbi	The n-type silicon of the rare earth elements investigated was characteristic of the receptor. The values of diffusion parameters of all rare earth elements were found to be specific to the III group elements of the periodic system of elements of DI Mendeleev.
Tuliy	The n-type silicon of the rare earth elements investigated was characteristic of the receptor. The values of diffusion parameters of all rare earth elements were found to be specific to the III group elements of the periodic system of elements of DI Mendeleev.
Silver	After the introduction of silver, the spectrum of photochemistry and induced photochemistry were studied. These compounds have created deep levels in the silicon-restricted area.

These results are used in various fields of science and technology. Including:

in the manufacture of instruments in electrical engineering;

increasing the electrical conductivity of semiconductor devices;

creation of technology for processing semiconductor devices and managing technological processes;

using a photo-capture method to control deep levels;

in the production of photographic and magnetic sensors;

in the calculation of high-throughput and thermal modes of obtaining low-conductance dielectric materials;

the creation of devices such as photosensitive elements, integrated photovoltaic receivers, injectable infrared photoproducts, multifunctional diodes and electron pairs;

crystalline silicon surfaces;

formation of a prohibited zone of semiconductors;

to determine the thermal equilibrium of the semiconductor mixture solution and to control the radiation degradation of the material;

creation of universal devices for the study of the properties of the semiconductor materials and phenomena in a wide range of temperatures, pressures, electric and magnetic fields;

development of semiconductor silicon extraction method for studying deep layers of silicon;

photo and thermal sensitivity;

in production of sensitivity sensors and devices;

atoms of the mixture;

optimization and stability of parameters of semiconductor devices;

in the development of technology for the production of high-sensitivity photoprocessors with infrared radiation;

the new local getter method for the external getter of rare earth elements;

the effects of diffusive vapor pressure on the diffusion coefficient and the results of a study of the concentration of electroactive atomic elements in the Mendeleev table in improving the technology of obtaining compensated materials;

vapor diffusion pressure and the effect of the electric field on the photoelectric properties of the optimization of the parameters of the photoperiod;

the production of various photosensitive conductivity and high photosensitive material;

preparation of a semiconductor dosimeter measuring absorbed high energy and ionizing radiation from neutron inserted discrete silicon;

changes in the dynamics of absorption and regeneration of photovoltaics, which determine the relative contribution of one and two electron accepting processes to the recombination of non-essential carriers;

creation of dynamic and mechanical pressure modifiers with compensated silicon and structural samples of elements;

Increasing the relative resistance of semiconductor devices to the required value by means of external pressure;

Creation of a completely new type of solid-state generators and highly sensitive devices to external forces (temperature, pressure, and magnetic field intensity) in functional electronics based on injection auto vibrations;

creation of new types of pressure, magnetic field, temperature measuring devices and solid-state generators working in the field of sound frequency, operating around room temperature;

The use of the observed effects on the Si <Au> and Si <Ni> specimens in semiconductor electronics, and based on these effects, in the creation of a pulsed tenzoelectric mechanical pressure converter;

in the production of radiation resistant and temperature-sensitive thermoresistors;

the creation of electrical signal converters of mechanical quantities acting on various physical effects observed in highly compensated silicon;

creation of a universal device for the study of the tenzo property of a wide range of electric, magnetic fields, temperature and pressure under different illumination conditions;

It is used in the development of a new method for the removal of silicon-diffusing impurities and increasing the thermal temperature.

It also has a device that allows to study the tensile properties of structures under pressure. A universal tensor converter with wide pressures is created.

The *p-i-n* structure with a good thermosensitivity (2.1 mVK) at 20K to 500K was obtained by placing the P^+ and Ba^+ ions on both sides of the Si monocrystalline at different energies and at different rates.

Due to the interaction of titanium and iron atoms, iron atoms are observed in the silicon volume. This allows the silicon material to be removed from the iron, one of the uncontrollable surfaces that is constantly formed. In the process of incorporating titanium atoms into silicon, which is legioned with europe, the presence of europe allows increasing the efficiency of titanium atoms formation and stabilizing its properties.

At high temperatures in the open volume, the sulfur is absorbed into the silicon and increased resistance to radiation exposure. A new technological method for obtaining light-sensitive materials in the near-IR field has been developed and a device for measuring different radiation power based on compensated silicon has been proposed.

The process of decomposition of excipients under external influences (pressure, radiation, thermal treatment) depends mainly on their size and shape, which is initially small (0.5 ÷ 1 μm) in dissimilar and needle-shaped (R = 4 • 108 Pa, T = 773 K). Presets, and then (R = 12 • 108 Pa) were found to decompose lens-like and spherical precursors of similar size. Methods for controlling the electrophysical parameters of the predicted Si <Ni> samples are shown. The presence of gadolinium, Samar and European atoms in silicon reduces the rate of thermal and radiation defects.

New physical effects and laws make a significant contribution to the development of semiconductor physics and enable the creation of a new scientific direction "Tenzoelectric properties of highly charged semiconductors and their devices".

It has been established that the formation of n-type silicon in the cultivation of silicon leads to an increase in the radiation resistance of the material.

The possibilities of application to technological processes in national economy are shown. The tensile dosage of compensated silicon, tensile converter and universal tensile converters for the technological process of measuring spray particles have been created and shown to be practical.

By introducing P and B ions on different sides of the Si (111) monocrystals and heating them with infrared or laser beams, a *p*-*i*-*n*-transition was obtained with a high tensose sensitivity of 20 to 500 K.
Microelectric industry is used in the field of generating non-renewable energy sources.
Experimental results from vanadium-compensated silicon structures and diodes based on them can be used in the production of semiconductor infrared photoconductors.

This table can be used by undergraduate, graduate and undergraduate students, undergraduate and graduate students in semiconductor and dielectric physics.

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