

METALLOIDS AND THEIR PROPERTIES

students Murenya V.D., Silkina A.S.

scientific supervisor – senior lecturer Matusevich O.A.

Belarusian National University of Technology

Minsk, Belarus

In the Periodic Table there is a red stair-step line dividing the table into metals and nonmetals. Some elements on either side of the red line are in green blocks. These elements are "borderline" between metals and nonmetals. They are called metalloids. These are elements that have properties in between metals and nonmetals. The word metalloid means "metallike."

As for physical properties, all of the metalloids are solids having the appearance of metals. Most of them are white or gray like metals, but are not as shiny. The metalloids are not as malleable and ductile as the metals.

Metals are good conductors of electricity. Nonmetals do not conduct electricity. Metalloids conduct electricity, but not as well as metals. This property makes metalloids very useful.

As for chemical properties, metalloids have properties that are common to metals. They also have properties that nonmetals have. Metalloids, however, do not follow patterns the way members of a group do. They are too individual in nature. In order to study the properties of the metalloids, you would have to study each element. In fact, the differences in chemical properties from element to element are what make metalloids so useful [1].

Because of their different chemical properties, the metalloids are very valuable. There are six of them in the Periodic Table: arsenic, antimony, boron, silicon, germanium, tellurium. Boron and silicon are two important metalloids.

Boron has a dull luster like metals, but it is very brittle like many nonmetals. It has three electrons in its outermost energy level. It is brownish-

black in color. Boron also has a high melting point (2,079°C) and a high boiling point (2,550°C). Boron is a poor conductor of electricity at low temperatures. However, as the temperature of the solid is increased, boron becomes a good conductor. Boron and other elements with this property are called semiconductors. Metals, by comparison, become poor conductors as the temperature rises. This property of boron makes it useful to industry. It can be used in electrical devices that have to function at temperatures too high for metals [2].

Silicon is a dark-gray solid, hard and brittle. It has four electrons in its outer energy level. Almost all of the compounds of silicon contain oxygen. Silicon is the second most abundant element in the earth's crust. It is present in many rocks and minerals. Sand is made of a compound of silicon, silicon dioxide. Silicon has many uses in industry. It, too, is a semiconductor. It is also used in making glass and in the production of cement.

As the aerospace industry grew, it needed a way to obtain electricity from the sun. Scientists produced extremely pure crystals of silicon. They then added tiny amounts of other substances to the pure silicon. These substances, called impurities, make silicon crystals better conductors. When the crystals are exposed to sunlight, electricity is produced.

References

1. Four Properties of Metalloids [Electronic resource]. – Mode of access: <https://sciencetrends.com/4-properties-of-metalloids/>. – Date of access: 13.03.2023.

2. Metalloids: Properties and Uses [Electronic resource]. – Mode of access: <https://www.xometry.com/resources/materials/metalloids/>. – Date of access: 23.03.2023.