

Journal of Geology, Geography and Geoecology

Journal home page: geology-dnu.dp.ua

ISSN 2617-2909 (print)
ISSN 2617-2119 (online)

Journ. Geol. Geograph.
Geology,
32(2), 217-223.

[doi:10.15421/112320](https://doi.org/10.15421/112320)

O.O. Beidyk, O.O. Komliev

Journ. Geol. Geograph. Geoecology, 32(2), 217-223

Mineral and raw material self-sufficiency of Ukraine: a geographical mensuration

Oleksandr O. Beidyk¹, Oleksandr O. Komliev²

¹*Bogdan Khmelnytsky Melitopol State Pedagogical University, Zaporizhzhia, Ukraine*

²*Taras Shevchenko National University of Kyiv, Kyiv, Ukraine, morpha2007@ukr.net*

Received 22.09.2022;

Received in revised form 13.02.2023;

Accepted 03.03.2023

Abstract. For a more objective assessment of Ukraine's resource self-sufficiency, monitoring of its natural resource environment, in particular, subsoil, is used, which is an important factor in insuring economic stability and security of the state. A component of this scientific and practical issue is the expansion and deepening of the systemic manifestations of the placement of geochemical resources on the territory of Ukraine with the help of economic-geographical zoning schemes and the table of chemical elements, which are considered as fundamental methodological levers.

The authors of the article analyzed the most significant generalizing works of Ukrainian and foreign specialists devoted to mineral resources of Ukraine. The purpose of the study is to adapt the Periodic table of chemical elements by D. I. Mendeleev for the systematization of ideas and cartographic modeling regarding the distribution of mineral deposits in the section of economic and geographical areas of Ukraine. The positioning and realization of the purpose serves as the evidence base of mineral-raw material self-sufficiency of Ukraine, it is evidence of the mineral-raw material and economic-geographic strengthening of the role of D. I. Mendeleev's table. The objective idea of mineral and self-sufficiency of Ukraine, its inclusion in the top groups of the states most provided with the most valuable types of minerals is strengthened and the high level of availability of mineral resources in Ukraine in terms of its economic and geographical areas and regions is confirmed. At the same time, a number of mineral deposits in modern socio-economic conditions are preserved and not used. For the first time a cartographic interpretation of the periodic table of chemical elements (D.I. Mendeleev's table) is given, which is reinforced by data on the distribution of mineral resources and minerals in terms of economic and geographical regions and areas of Ukraine. There are 33 chemical elements extracted from more than 100 mineral deposits. The information on geochemical raw materials available in Ukraine is systematized by three items (elements of rock-forming minerals → rock-forming minerals → main deposits), which update the cartograms and map diagrams placed on the diagram. The provisions and conclusions of the article testify to the mineral self-sufficiency of Ukraine and can act as a lever for developing strategies for socio-economic development of the regions of Ukraine. D.I. Mendeleev's table and its mineral content are positioned as an objective factor in the specialization of Ukraine and the international geographical division of labor. It is noted that the main advantages of the Periodic table of chemical elements, including its structure, logic, objectivity, system in relation to the economic and geographical regions of Ukraine are considered as an element of monitoring the mineral component of natural resources of the country, the lever of further development of exploratory geology and geomorphology. The highlighted issues revealed a high density of interdisciplinary connections of the subject-object plane of research (geography, geology, cartography, chemistry, geochemistry, economics, regional studies, zoning), and the presented material can be introduced into the latest programs of reformed education in Ukraine.

Keywords: mineral resources, D.I. Mendeleev table, economic and geographical zoning.

Мінерально-сировинна самодостатність України: географічний вимір

О.О. Бейдик¹, О.О. Комлів²

¹*Мелітопольський державний педагогічний університет імені Богдана Хмельницького, Запоріжжя, Україна*

²*Київський національний університет імені Тараса Шевченка, Київ, Україна, morpha2007@ukr.net*

Анотація. Для більш об'єктивної оцінки ресурсної самодостатності України використовується моніторинг її природно-ресурсного середовища, зокрема, надр, що є важливим чинником забезпечення економічної стабільності та безпеки держави. Складовою цієї науково-практичної проблематики є розширення та поглиблення системних уявлень про розміщення геохімічної сировини на території України шляхом використання схем економіко-географічного районування та таблиці

хімічних елементів, які розглядаються як фундаментальні методологічні важелі. Автори статті проаналізували найбільш значні узагальнюючі роботи українських і зарубіжних фахівців, присвячених мінерально-сировинним ресурсам України. Метою дослідження є адаптування Періодичної таблиці хімічних елементів Д. І. Менделєєва для систематизації уявлень і картографічного моделювання щодо поширення родовищ корисних копалин у розрізі економіко-географічних районів України. Позиціонування та реалізація мети виступає доказовою базою мінерально-сировинної самодостатності України, є свідченням мінерально-сировинного й економіко-географічного посилення ролі таблиці Д. І. Менделєєва. Підтверджено високий рівень забезпечення території України мінерально-сировинними ресурсами. Вперше дана картографічна інтерпретація Періодичної таблиці хімічних елементів (таблиця Д. І. Менделєєва), яка посилена даними щодо розподілу мінерально-сировинних ресурсів та корисних копалин в розрізі економіко-географічних районів та регіонів України. Наведено 33 хімічні елементи, які видобуваються на понад 100 родовищах корисних копалин. Положення та висновки статті засвідчують мінерально-сировинну самодостатність України та можуть виступати важелем розробки стратегій суспільно-економічного розвитку регіонів України. Таблиця Д.І. Менделєєва та її мінерально-сировинне наповнення позиціонуються як об'єктивний чинник спеціалізації України та міжнародного географічного розподілу праці. Висвітлена проблематика виявила високу щільність міжпредметних зв'язків предмет-об'єктної площини дослідження (географія, геологія, картографія, хімія, геохімія, економіка, регіоналістика, районування), а викладений матеріал може бути впроваджений у новітні програми реформованої освіти України.

Ключові слова: мінерально-сировинні ресурси, таблиця Д.І. Менделєєва, економіко-географічне районування.

Introduction

Diagnostics of Ukraine's mineral resource self-sufficiency, monitoring of the natural resource environment and the state of its subsoil is an important factor in the economic stability of the state. A component of this scientific and practical problem is the expansion and deepening of systemic understanding of the location of geochemical raw materials in Ukraine through the use of economic and geographical zoning schemes and a table of chemical elements, which are considered as fundamental methodological levers (Svidotstvo pro reiestratsiiu avtorskoho prava na tvir № 75014..., 2016).

A significant number of publications by domestic and foreign specialists – geologists, geographers, and naturalists – are devoted to Ukraine's mineral resources and mineral deposits (Beidyk, 2018; Beidyk, 2019; *Geologiya SSSR*..., 1958; *Metalichni i nemetalichni* ..., 2006; *Restrukturyzatsiia* ..., 2007; Rudko et al., 2019). On the other hand, the genius invention of D.I. Mendeleev, his periodic table of chemical elements, has been at the center of both world scientific thought and the practical development of the strategies it laid down for more than a hundred years, because instead of scattered, unrelated compounds, science has been presented with a single coherent system that united all chemical elements into one. The table was supplemented with examples of specific mineral deposits of Ukraine in (Beidyk and Padun, 1996; Beidyk, 2018), and the characteristics of mineral deposits of Ukraine are presented in a number of fundamental sources (*Geologiya SSSR*1958; *Metalichni i nemetalichni* ..., 2006; *Restrukturyzatsiia* ..., 2007; Rudko et. al.) The proposed material is an attempt to strengthen the mineral, raw material, economic and geographical table of D.I. Mendeleev, to demonstrate interdisciplinary connections in the study of the geography of

Ukraine and the natural resource self-sufficiency of the state.

There are a large number of naturally occurring and man-made substances (chemical elements and compounds, alloys, solutions, polymers) on the Earth. The distribution of chemical elements and mineral deposits on the Earth is not uniform. This heterogeneity is reflected in the following chain of levels of mineral resource endowment of countries and territories: very low → low → medium → high → very high. The extreme links of this chain can be represented, for example, by Paraguay (very low level of mineral endowment) and the South Africa (very high level of mineral endowment). According to various estimates, Ukraine ranks between the third (medium) and fourth (high) level in this ranking. About 20 thousand deposits and 117 types of mineral occurrences have been discovered in Ukraine's subsoil, which contain 8291 deposits of 97 mineral types are of commercial importance and are accounted for in the State Reserves Balance Sheet. Ukraine's mineral resources largely determine the national division of labor and Ukraine's place in the global production of minerals. In terms of the potential value of confirmed recoverable mineral reserves in the subsoil, it ranks 12th in the world (2.2% of the potential value of world reserves) (*Restrukturyzatsiia*..., 2007). In terms of energy resources, some experts believe that Ukraine has historically had large resources in both oil and gas. This publication is an objective basis for such fundamental assessments and aims to demonstrate the self-sufficiency of the state in terms of the most important mineral resources.

The purpose of the study is to adapt the Periodic table of chemical elements by D.I. Mendeleev for systematization of ideas and cartographic modeling of the distribution of mineral deposits in the context of economic and geographical areas and regions of

Ukraine. The positioning and realization of the goal serves as an evidence base for Ukraine's mineral resource self-sufficiency.

Materials and methods

In writing the article, the authors used deductive, comparative geographical (analysis of geographical maps of minerals, mineral resources of Ukraine in the context of economic and geographical regions), cartographic and cartographic modeling (cartographic interpretation of the Table of D.I. Mendeleev), monographic (analysis of fundamental works of leading domestic and foreign geologists and resource scientists, geological and mineral resource reference books and dictionaries, multi-volume publications on geology and mineral resources of Ukraine) methods, systematic approach, modern computer technologies (Arc GIS Online, Adobe Illustrator CC) were used in data processing and systematization. Both GIS technologies and classical methods of cartographic representation (localized icons, cartograms and cartodiagrams) were used to create cartographic models.

Results and their analysis

In theoretical and practical terms, economic and geographical zoning, like a geographical map, plays an important role both at the beginning of any study, when its fundamental paradigm is laid down, and at the end, when certain elements of integration of zoning components, its configuration and contours are deepened, clarified or refuted. The analysis of the theoretical foundations, principles, criteria of economic and geographical zoning in general and schemes of economic and geographical zoning of Ukraine has shown some variability in scientific and practical approaches and results of this procedure (Alampiev, 1963; Palamarchuk, 1975; Popovkin, 1993; Pistun et al, 2019; Pistun et al., 2004; Sotsialno-economic heohrafiia Ukrainy, 2000; Sotsialno-economic raionuvannia Ukrainy, 1997). The main idea of economic zoning and its practical significance is to optimize the structure of the socio-economic complex and all its components, taking into account the specifics of a particular territory, which is crucial in the formation and development of the processes of specialization, complexity, balance and proportionality. In the course of mastering the material, a number of the most well-known schemes of economic, geographical and economic zoning of the territory of Ukraine were analyzed.

Zoning is one of the main methods of studying spatial phenomena, a lever and a factor in solv-

ing a number of scientific and practical problems. Despite we are now at the beginning of the decentralization reform, the breakdown of production ties and the actual elimination of economic and geographical regions, the scientific and practical importance of the latter remains quite significant. There are a number of developments by leading domestic and foreign geographers on the issues of economic and economic-geographical zoning. This publication uses one of these schemes – the economic and geographical zoning of M. D. Pistun (1996), which includes 9 districts: 1) Capital or Kyiv (Kyiv, Chernihiv, Zhytomyr regions); 2) Central (Kirovohrad, Cherkasy regions); 3) Prydniprovskiyi (Zaporizhzhia, Dnipropetrovskia regions); 4) Donetsk (Donetsk, Luhansk regions); 5) Podilskiyi (Vinnytsia, Khmelnytskyi, Ternopil regions); 6) North-Eastern (Kharkiv, Poltava, Sumy regions); 7) Carpathian (Lviv, Ivano-Frankivsk, Zakarpattia, Chernivtsi regions); 8) North-Western (Volyn, Rivne regions); 9) Black Sea (The Autonomous Republic of Crimea, Odesa, Mykolaiv and Kherson regions) (Pistun, 1996; Pistun et. al, 2019; Pistun et al., 2004).

A systematic view of Ukraine's mineral resource endowment both in general and by regions (Donbas, Crimea, etc.) or economic area (in some cases, by regions) is given in table 1, where economic and geographical areas are indicated by the corresponding numbers, and its explanation (table 2).

Chemical elements in their free state are very rare, more often they are part of various compounds, which is why we consider them as components of the most common minerals in Ukraine, for example copper (Cu) is a part of chalcocene (Cu_2S), tetrahedrite ($Cu_{12}Sb_4S_{13}$), chalcopyrite ($CuFeS_2$); lead (Pb) is a part of galena (PbS), boulangerite ($5PbS \times 2Sb_2S_3$), cerussite ($PbCO_3$); silicon (Si) is a component of quartz (SiO_2), opal ($SiO_2 \cdot nH_2O$), chalcedony (SiO_2), staurolite ($Fe[OH]_2 \cdot 2Al_2SiO_5$), and twenty others. The same way for each element. Miscellaneous combustible hydrocarbons (CH_3 and CH_4) in the mixture are part of the oil. Inert elements are part of the combustible gas.

The numbers indicate economic and geographical regions of Ukraine according to the classification of M. D. Pistun (1996). The Table by D. I. Mendeleev indicates the places and territories where minerals and minerals corresponding to certain chemical elements are found. As can be seen from table 2, more than 30 chemical elements are extracted from more than 100 mineral deposits. In addition to the minerals discussed, the natural resource potential includes water, climate, land, flora and fauna.

Table 1. Mineral deposits of Ukraine in the context of economic regions (according to M.D. Pistun, 1996) in the Periodic table of chemical elements (tables of D.I. Mendeleev)

Periods	Groups of elements												
	I	II	III	IV	V	VI	VII	VIII					
I	H							He					
II	Li 3	Be	B	C 3, 4, 7, 9	N	O	F 1, 4, 5, 7, 8, 9	Ne					
III	Na 3, 4, 7, 8	Mg 3, 5, 7, 8, 9	Al 2, 3, 4, 5, 6, 8, 9	Si 2, 3, 4, 5, 6, 7, 8, 9	P 1, 3, 5, 6, 9	S 3, 4	Cl 3, 4, 7	Ar					
IV	K 2, 3, 4, 7	Ca 4, 5, 7, 8, 9	Sc	Ti 3, 4, 5, 7, 9	V	Cr 3, 8	Mn 3, 7	Fe 3, 4, 6, 9	Co	Ni 3, 5			
	Cu 3, 4, 5, 7, 8	Zn 4, 7	Ga	Ge 4, 7, 9	As	Se	Br 9	Kr					
V	Rb	Sr 4, 7	Y	Zr 3, 4	Nb	Mo 3, 4	Tc	Ru	Rh	Pd			
	Ag 4, 7	Cd	In	Sn 3	Sb 3, 4	Te	I	Xe					
VI	Cs	Ba 1, 4, 7, 8	La 9	Hf	Ta	W	Re	Os	Ir	Pt 3			
	Au 3, 7	Hg 4, 7, 9	Tl	Pb 4, 7	Bi	Po	At	Rn					
VII	Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Uun			
Lanthanides													
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Actinoids													
Th	Pa	U 2 3	Np	Pu	Am	Cm	Bk	Cr	Es	Fm	Md	No	Lr

Table 2. Mineral deposits by regions of Ukraine (detailed in Table 1)

Chemical elements	Rock-forming minerals	Main deposits
aluminum	corundum, alunite, staurolite, pyrophyllite, augite, epidote, spessartine, almandine, pyralpsite	Prydniprovnia (Vysokopil, Smila, Kremenchuk, Kryvyi Rih), Donbas (Chasiv Yar), Crimea (Karadag), Volyn (Ovruch), Pobuzhzhia
barium	barite	Zakarpattia (Beganske), Donbas (Nagolny Kriazh), Zhytomyr region (Holovynske, Turchynske), Transnistria
carbon	graphite, calcite, magnesite, dolomite, siderite, smithsonite, aragonite, cerussite, coal	Prydniprovnia (Zavalske, Petrivske, Pravdynske, Kryvyi Rih), Donbas (Mykytivske, Naholnyi Kriazh, Slovianske), Crimea (Baidaratske, Kerch peninsula), Zakarpattia (Trebushanske, Buzhanske, Berehove).
iron	pyrrhrole, pyrite, marcasite, arsenopyrite, hematite, magnetite, chromite, ilmenite, goethite, limonite, siderite, vivianite, staurolite, olivine, augite, aegirine, muscovite, biotite, vermiculite, epidote, chlorite, ferruginous quartzite	Crimea (Kerch peninsula), Donbas (Naholnyi Kriazh, Mykytivske), Prydniprovnia (Kryvyi Rih, Kapitonivske, Lypovenkivske, Samotkanske, Volynske, Seredniodniprovske, Kremenchukske)
gold	–	Dnipropetrovska region (Nikopol district, Chortomlynska geological structure), Zakarpattia (Muzhiyevo)
potassium	alunite, muscovite, biotite, lepidolite, sylvite, nepheline, feldspar	Donbas (Chasiv Yar) Prydniprovnia (Vysokopil, Smila), Western Pryazovia, Zakarpattia (Berehove), Prykarpattia (Kalush, Stebnytsia)
calcium	calcite, dolomite, aragonite, anhydrite, apatite, epidote, diopside, augite, fluorite, shabazite, titanite	Crimea (Baidaratske), Donbas (Slovianske), Zakarpattia (Dilove, Buzhenske), Volyn, Prykarpattia, Pobuzhzhia, Chernihiv, Ivano-Frankivsk, Khmelnytsky regions, Transnistria
silicon	quartz, opal, chalcedony, staurolite, olivine, pyralpsite, almandine, spessartine, epidote, diopside, augite, aegirine, talc, pyrophyllite, chlorite, muscovite, biotite, lepidolite, vermiculite, topaz, titanite, zircon, shabazite, nepheline, feldspar	Donbas (Nagolny Kriazh), Volyn (Ovrutsk), Crimea (Karadag), Pobuzhzhia, Azov, Zakarpattia, Prydniprovnia (Kremenchuk, Kryvyi Rih, Samotkan)
lithium	lepidolite	Prydniprovnia

magnesium	magnesite, dolomite, olivine, pyralospite, diopside, augite, talc, chlorite, biotite, vermiculite	Middle Prydniprovnia (Kryvyi Rih, Pravda), Azov, Carpathians, Volyn, Pobuzhzhia, Crimea
manganese	pyrolusite, manganese	Prydniprovnia (Nikopol, Ingulets), Carpathians
arsenic	realgar, auripigment	Donbas (Mykytivske), Crimea (Kerch peninsula), Zakarpattia (Kvasy)
copper	malachite, azurite	There are no assessed deposits, only ore occurrences: Donbas (Nagolny Kryazh, Mykytivske), Azov region (Maloyanison-ske), Zakarpattia, Volyn, Podillya, Prydniprovnia
molybdenum	–	Donbas, Prydniprovnia
sodium	mirabilite, aegirine, nepheline, halite, feldspar	Volyn, Pryazovia, Kryvyi Rih, Middle Prydniprovnia, Prykarpattia (Kalush-Stebnytsia field)
nickel	nickel, mylerite, pentlandite	Middle Prydniprovnia, Pobuzhzhia (Derenyukhske, Lypovenkivske)
tin	cassiterite	Prydniprovnia
platinum	–	Dnipropetrovskia region (Nikopol district, Chortomlynska geological structure)
mercury	cinnabar	Donbas (Mykytivske), Zakarpattia and Crimea
lead	galena, boulangerite, cerussite	Donbas (Nagolny Kryazh), Prykarpattia, Transcarpathia (Bereziv, Vyshkiv, Berehove)
sulfur	chalcocite, galena, sphalerite, pyrrhotite, chalcopyrite, cinnabar, antimonite, realgar, auripigment, molybdenum, pyrite, marcasite, arsenopyrite, boulangerite, tetrahedron, barite, celestine, anhydrite, gypsum, mirabilite, alunite	Prydniprovnia (Vysokopil, Smila), Donbas (Mykytiv, Nagolny Kriazh), Crimea (Kerch peninsula), Transnistria (Rudal, Yaziv, Lubyn, Humenets), Prykarpattia (Kalush, Stebnytsia).
silver	–	Donetsk region (Nagolny Ridge), Zakarpattia (Kvasivske)
strontium	–	Prykarpattia, Podillia
trumpet	antimonite, tetrahedron, boulangerite	Donbas (Mykytivske, Naholny Kriazh), Zakarpattya
titanium	rutile, augite, titanite, ilmenite	Zhytomyr region (Irshanske), Zakarpattia, Carpathians, Pobuzhzhia, Crimea, Azov region, Central Prydniprovnia (Samotkan, Volyn, Seredniodniprovnia)
zinc	zinc plating	Donbas (Nagolny Kriazh), Prykarpattia (Truskavets area), Zakarpattia (Berehove, Vyshkiv, Berezivske)
chrome	chromite, celestine	Middle Prydniprovnia (Kapitonivske, Lypovenkivske), Volyn, Pryazovia, Kryvyi Rih
fluoride	muscovite, biotite, lepidolite, topaz, fluorite	Vinnitsia region (Mohyliv-Podilskyi district), Western Azov, Volyn, Prydniprovnia, Ivano-Frankivsk and Chernihiv regions, Donbas
phosphorus	apatite, vivianite	Donbas (Osykivske), Prydniprovnia (Novopoltavske), Chernihiv and Khmelnytskyi regions, Crimea (Kerch peninsula)
chlorine	Galit, Sylvain	Donbas (Slovianske, Bakhmutske), Prykarpattia (Kalush, Stebnytsia), Zakarpattya
zirconium	zircon	Prydniprovnia (Samotkanske, Rozsypne), Azov region
volatile hydrogen compounds	–	Poltava region (Hlynsko-Rozbyshivske), Sumy region (Kachanivske, Rybalske), Chernihiv region (Hnidynstivske, Leliakivske), Ivano-Frankivsk region (Dolyna and Lviv region (Truskavets, Boryslavske)
inert gases	–	Crimea (Hlebivske, Dzhanikoyske), Kharkiv region (Shebelinka), Poltava region (Hoholivske, Solokhivske), Dnipropetrovsk region (Bereshenyne), Lvivska region (Rudkivske, Khodnovytske)

The above was «converted» into a cartographic model, which is an interpretation of the Periodic table of chemical elements (Fig.1).

The map allows us to distinguish two conditional areas of relative concentration of minerals – Eastern (Prydniprovskiyi and Donetsk economic and geographical areas) and Western (Carpathian economic and geographical area), which indicates not only significant actual deposits, but also high mineral resource potential of these territories (latent deposits).

At the same time, a significant portion of the largest European country by area still remains a mineral resource terra incognita, with its subsoil still waiting to be exploited. Isn't this a fundamental factor that will give Ukraine optimism about its future? The fundamental advantages of the Periodic table of chemical elements, including its structure, logic, objectivity, and systematic approach to the economic and geographical areas of Ukraine, are considered as an element of monitoring the mineral resource

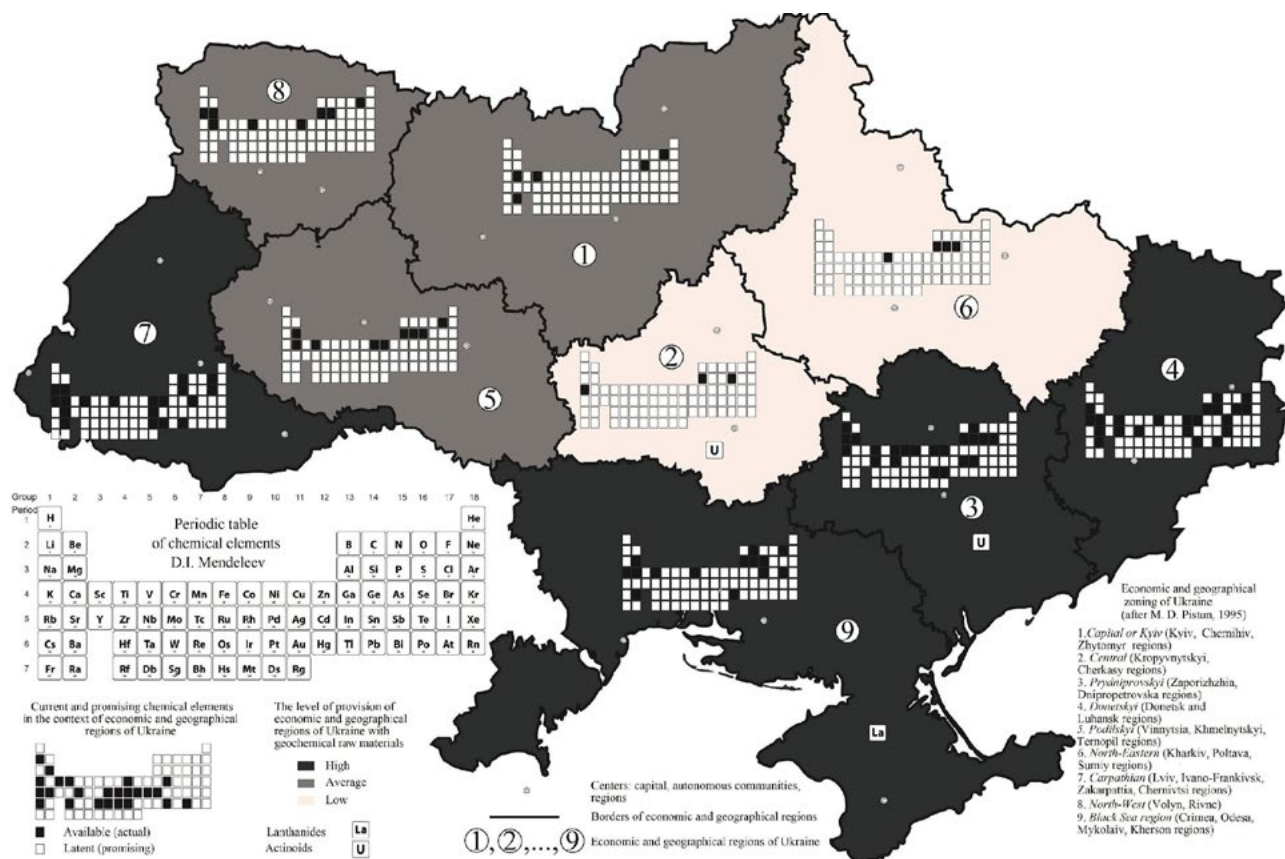


Fig. 1. Distribution of available and latent chemical elements of the periodic table within economic and geographical regions of Ukraine.

component of the country's natural resources, and a lever for further development of exploration geology and geomorphology. It should be noted that there are three forms of the Periodic Table of chemical elements: «short» (short-periodic), «long» (long-periodic) and «extra-long» (the legend of the map uses the «long» form of the table).

Thus, D. I. Mendeleev's table is supplemented with data on the distribution of mineral resources and minerals by economic and geographical regions of Ukraine and is presented visually (Svidotstvo pro reiestratsiiu avtorskoho prava na tvir No. 750142016). It should be noted that the cartographic and textual information contained in the article is open to interpretation and further steps to deepen and broaden the understanding of the qualitative and quantitative analysis of the most important national and regional mineral deposits.

Conclusions:

- For the first time, a cartographic interpretation of the Periodic table of chemical elements (D.I. Mendeleev's table) is given, which is reinforced by data on the distribution of mineral resources and miner-

als in the context of economic and geographical areas and regions of Ukraine;

- the material presented substantiates the mineral resource self-sufficiency of Ukraine and can act as a lever for driving strategies for the socio-economic development of the regions of Ukraine;

- an objective view of the mineral resource self-sufficiency of Ukraine, its entry into the top groups of countries most endowed with the most valuable types of minerals has been strengthened and a high level of availability of mineral resources in Ukraine in the context of its economic and geographical areas and regions has been confirmed; at the same time, a number of mineral deposits under current socio-economic conditions are mothballed and not used;

- information on the geochemical raw materials available in Ukraine is systematized into three positions (elements of rock-forming minerals → rock-forming minerals → main deposits), which actualizes the cartograms and cartodiagrams placed on the map;

- The Periodic table and its mineral resources are positioned as an objective factor of Ukraine's specialization and international geographical division of labor;

– the highlighted issues confirmed the high density of interdisciplinary connections (geography, geology, chemistry, cartography, geochemistry, economics, regionalism, zoning);

– the provisions and conclusions of the article can be implemented in the latest programs of reformed secondary and higher education in Ukraine.

References

- Alampiyev, P.M. (1963). Ekonomicheskoye rayonirovaniye SSSR: v 2-kh kn. [Alampiev, P.M. Economic zoning of the USSR: in 2 books]. M.: 1959–1963. Book. 1, Moskow. Gosplanizdat; Book. 2, M. : Economizdat. (In Russian).
- Beidyk, O. O., Padun, M. M. (1996). Heohrafiia: posibnyk dlia vstupnykiv do vishchych navchalnykh zakladiv – 2-e vyd. [Geography: A Guide for Entrants to Higher Education]. Kiyv Libid (In Ukrainian).
- Beidyk, O.O. (2018). Osnovni rodovyshcha korysnykh kopalyn u tablytsi D. I. Mendelieieva: natsionalnyi vymir [About the Main Mineral Deposits in the Table of D.I. Mendeleev: the national dimension]. Bulletin of Taras Shevchenko National University of Kyiv. Geography. 3 (72). – Kiyv: Kyiv University Publishing and Printing Center. doi: 10.17721/1728-2721.2018.72.5. (In Ukrainian).
- Beidyk, O.O. (2019). Vyznachni rodovyshcha korysnykh kopalyn u tablytsi D.I. Mendelieieva: svitovyi vymir [Distinctive mineral deposits in the table of D.I. Mendeleev: the world dimension]. Bulletin of Taras Shevchenko National University of Kyiv. Geography. 1 (74). Kiyv. Publishing and Printing Center «Kyiv University». doi: 10.17721/1728-2721.2019.74.3. (In Ukrainian).
- Geologiya SSSR. T. V: Ukrainskaya SSR i Moldavskaya SSR. (1958) [Geology of the USSR: in 48 volumes – T. V: Ukrainian USSR and Moldavian USSR]. Moskow. Gosnauchtekhizdat literaturi po geologii i okhrane neдр. (In Russian).
- Metalichni i nemetalichni korysni kopalyny Ukrainy /D.S.Gurskij, K.Iu. Yesypchuk, V.I. Kalinin ta in.: u 2-kh kn. (2006) [Metallic and nonmetallic minerals of Ukraine]. K.–Lviv: Center of Europe. T. I .: Metallic minerals; T. II : Non-metallic minerals. (In Ukrainian).
- Palamarchuk, M. M. (1975). Ekonomichna heohrafiia Ukrainskoi RSR (z osnovamy teorii) [Economic geography of the Ukrainian SSR (with the basics of theory)]. Kiyv. Glad. school. (In Ukrainian).
- Popovkin, V.A. (1993). Rehionalno-tsilisnyi pidkhid v ekonomitsi [Regional-holistic approach in the economy]. NAS of Ukraine. Council for the Study of Productive Forces of Ukraine. Kiyv. Scientific Thought. (In Ukrainian).
- Pistun, M.D. (1996). Osnovy teorii suspilnoi heohrafi [Fundamentals of the theory of social geography]. Kiyv. High School, (In Ukrainian).
- Pistun, M.D., Oliinyk, Ya.B., Mezentsev, K.V., Melnichuk, A.L. (2019). Teoretyko-metodolohichna kontseptsiiia rehionalnoho rozvytku Ukrainy: suspilno-heohrafichnyi aspekt [Theoretical and methodological conception of regional development of Ukraine: socio-geographical aspect]. Kiyv. Phoenix, (In Ukrainian).
- Pistun, M.D., Mezentsev, K.V., Torlo, V.O. (2004) Rehionalna polityka v Ukraina: suspilno-heohrafichnyi aspekt [Regional policy in Ukraine: socio-geographical aspects] Kiyv. Publishing and printing center «Kyiv University». (In Ukrainian).
- Restrukturyzatsiia mineralno-syrovynnoi bazy Ukrainy ta yii informatsiine zabezpechennia. (2007) [Restructuring of the mineral resources base of Ukraine and its information support]. Kiyv. Naukova Dumka. (In Ukrainian).
- Rudko, H.I., Ivanov, Ye.A., Kovalchuk, I.P. (2019). Hirnychopromyslovi heosystemy Zakhidnoho rehionu Ukrainy: monohrafiia [Mining geosystems of the Western region of Ukraine : monograph]. K. Chernivtsi : Bukrek, Vol. 1. 464 p.; Vol. 2. 376 p. (In Ukrainian).
- Sotsialno-ekonomichna heohrafiia Ukrainy: navch. posib. /za red. O.I. Shabliia. (2000). [Socio-economic geography of Ukraine: Educ. tool.]. Lviv: World. (In Ukrainian).
- Sotsialno-ekonomichne raionuvannia Ukrainy. (1997). [Socio-economic zoning of Ukraine]. M.I. Dolishnii, M.M. Palamarchuk, O.M. Palamarchuk, L.T. Shevchuk. Lviv. (In Ukrainian).
- Svidotstvo pro reiestratsiiu avtorskoho prava na tvir № 75014. Ukraina. Vydatni rodovyshcha korysnykh kopalyn v tablytsi Mendelieieva: svitovyi ta natsionalnyi vymir. (2016). [Certificate of copyright registration for the work # 75014. Ukraine. Outstanding Minerals in the Mendeleev Table: World and National Dimension]. O.O. Beidyk – 11/27/2016. (In Ukrainian).