any future for industrial and depressed cities? Will there be more green, creative, smart cities in Ukraine? All these questions have determined the relevance of geographical studies of urban Ukraine, which is currently at the epicenter of spatial changes.

To recapitulate, my dissertation analytically presents the results of various urban studies, touching upon different aspects and integrating several thematic areas: there is research of national and regional networks and systems of urban settlements of various types, their evolution and development; studies of modern processes that take place in cities; determination of further ways of the development of urban settlements of Ukraine, taking into account the priorities of safety and comfort of living, using the potential of industrial heritage to form a new image of cities of the twenty-first century.

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COMPREHENSIVE RESEARCH OF THE GEOLOGICAL ENVIRONMENT FOR THE SAFE STORAGE OF CARBON DIOXIDE GAS

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At the current stage, burning coal, oil, gas, and oil products releases a huge amount of carbon dioxide into the atmosphere, which negatively affects the ecological situation around the world. Now, more than ever before, there is a need to dispose of man-made carbon dioxide within the framework of the Paris climate agreement signed by the world community. Gasocyclic injection of carbon dioxide into oil wells with oil of increased viscosity is the most promising and least expensive technology for increasing their oil yield. Injection of CO2 into the formation also solves the problems of its collection and disposal. The complex structure of collectors and covers requires extensive involvement of complex laboratory studies of the rocks that make them up.

Samples in the form of cylinders measuring 30x30 mm from the existing well cores were used for laboratory research: No. 7 Buzivska Square; No. 3 Nord-Pinyanska Square; No. 21, 28 Solotvynska Square; No. 33 Khidnovychska Square.

The most common group of rocks among the core samples presented for petrographic studies are psammite rocks, mainly with a finely fragmented structure

with clay-carbonate cement. Siltstones and clay rocks (argillites, marls) are present in subordinate quantities. The characteristic common for all the groups of studied rocks are the presence of a significant amount of carbonate material, mica minerals and carbon-organic matter in the rocks in close paragenesis with clay minerals. The bulk density of the investigated rocks in a dry state was determined by weighing and determining the geometric dimensions of special laboratory samples, and saturated samples by hydrostatic weighing with digital analytical balances WPS 360/c/2 (accuracy 0.001 g)

Different porosity causes variations in the volume density of dry extracted rock samples, which varies from 2033 kg/m3 to 2641 kg/m3, with its average value - 2440 kg/m3. The bulk density of the studied rocks saturated with the reservoir water model (NaCl solution, M=35 g/l) varies from 2281 kg/m3 to 2663 kg/m3, with its average value being 2534 kg/m3. The apparent mineralogical density of the rocks varies from 2585 kg/m3 to 2725 kg/m3, while its average value is 2685 kg/m3.

As a result of the analysis of the results of our lab studies of the coefficient of open porosity of rocks in atmospheric conditions by the gas volumetric method, it was established that this parameter changes from 0.039 to 0.253 with an average value of 0.107, and by the method of hydrostatic weighing: when the rocks are saturated with a formation water model (NaCl solution) - from 0.022 to 0.243 with an average value of 0.092.

The laboratory measurements using the VSC-1000 high-pressure unit made it possible to estimate the change in the porosity coefficient in reservoir conditions (ref=11-30 MPa, t=40-70 oC) for samples saturated with reservoir water model. As a result of the analysis of the results of laboratory determinations of the coefficient of absolute permeability of rocks, it was established that this parameter varies from 0.005 fm2 to 256.2 fm2 with its average value of 24.1 fm2.

Our studies of the permeability coefficient of rocks during the physical modeling of reservoir conditions were performed using the VSC-1000 high-pressure unit.

At the first stage of research, water was squeezed through the laboratory sample completely saturated with water (formation water model M=35 g/l) and the coefficient of permeability "through water" (kpr,v) was determined. At the second stage, carbon dioxide was pushed through the water-saturated sample and the coefficient of permeability "by CO2 with a completely water-saturated sample" (kpr,CO2) was determined. As a result of the analysis of the results of these studies, it was established that the coefficient of permeability "through water" varies from 0.001 fm2 to 10.48 fm2 with its average value of 1.144 fm2, the coefficient of permeability "through CO2 in a fully saturated sample" varies from 0.0004 fm2 to 12.243 fm2 with its average value of 1.194 sq.m.

As a result of the analysis of the performed laboratory studies, a number of correlational dependencies between filtration and capacity parameters were constructed.

In the course of the lab research, an experiment was performed to assess possible changes in the porosity and permeability of rocks under the action of aqueous solutions saturated with carbon dioxide on 4 samples with different filtration capacity parameters.

The samples were preserved after exposure to CO2 for 3 months. After that, the porosity and permeability were re-determined by the gas-volumetric method by purging with nitrogen. From the obtained data, we can draw a preliminary conclusion that the effect of carbon dioxide on the investigated sandstones leads to a decrease in their filtration capacity parameters. This is explained by the fact that sandstones consist mainly of quartz fragments. As a result of the reaction of mineral carbonation, there is a decrease in the pH of the water and the substitution of a weak acid in the solution. Therefore, SiO2 is displaced as a weaker acid in the solution, which precipitates in the form of amorphous silica (chalcedony) at increased pH.

To sum up, according to the results of the above complex of studies, it has been established that fine-clastic sandstones of the Nord-Pinyansk area are characterized by increased collector properties (samples NPn-2 (int. 1420-1428m), NPn-3 (int. 1590-1598m), NPn-4 (int. 1780-1788m) These samples are also characterized by a relatively high permeability and low carbonate content. Such sandstones can be promising sites for CO2 storage.

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WHAT IS MODULAR CONSTRUCTION?

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A modular building is a prefabricated building that consists of repeating sections called modules. Modularity involves building sections far from the construction site and then delivering them to the designated location. Assembly of prefabricated sections is completed on site. Prefab sections are sometimes placed using a crane. Modules can be placed side-by-side or in a stack, allowing for a variety of configurations and styles. Once placed, modules are connected using