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An integrated approach to the rational development of resources of gas-coal deposits

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One of the main minerals that ensures the functioning the Ukraine energy sector is coal, but its reserves buried in thin and very thin seams. In most cases, the occurrence of coal seams is accompanied by the presence of large quantities of methane gas in the coal-bearing massif, which in their properties can be regarded as an alternative form of energy to natural gas. This article reveals the features of the integrated development of gas fields in order to obtain a wide range of valuable energy and chemical raw materials.
It is proposed to use the synergetic approach based on the synthesis of geotechnological non-traditional development technologies in the conditions of existing coal mines for effective extraction and processing of gas-coal field resources as the main industrial reserves are run out. The coal seam is developed by thermochemical conversion by underground gasification, and mine methane is used to produce a new energy product in two ways: conversion of underground coal gasification generating gas to produce gas hydrate and methane recovery by mine degassing systems and its subsequent conversion to gas hydrate. The development of this direction with the justification of the parameters of gas hydrate deposition and transportation systems will make it possible to provide the infrastructure of the mining regions with additional energy resources.

A number of studies have been conducted to realize the above idea. The distribution of combustible and ballast gas concentrations is analytically determined, depending on the type of blast supplied to the underground gas generator. The parameters of obtaining maximum quantitative and qualitative indicators of energy and chemical raw materials are determined. The conditions of hydratonic accumulation from the time of hydrate formation with obtaining methan hydrates were experimentally established. It is revealed that the maximum is the hydration time at T = +1ºC and P = 10 MPa, which is 2.5 hours. The new technological scheme for the transformation of solid fuels from gasification and hydrating complexes which involves the integrated use of the obtained energy and chemical products in the thermochemical transformation of coal gas resources at the site of their occurrence is proposed.

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