Therefore, the problem of sustainable development in the town is compromised by both – the effects of industrial facilities and the low level of interest to the problems by local population, being not aware about their role in supporting environmental balance and having poor action competence in the field.

ECOLOGICAL FEATURES OF GREENHOUSE GAS CONVERSION USING THE EXAMPLE OF CO_2 PHOTOCATALYSIS

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With the increase in the level of carbon dioxide (CO_2) in the atmosphere, climate change has become one of the most important problems that threaten the existence of our planet. The rapid development of industry, consumer society, and the use of fossil fuels have led to a significant increase in CO_2 emissions. In this regard, today there is an urgent need to develop sustainable and environmentally friendly methods of reducing CO_2 emissions. One of these methods is CO_2 recycling. Due to the application of this process, it is possible not only to reduce the impact of CO_2 on the Earth's climate but also to turn it into valuable resources.

Photocatalytic conversion of CO_2 into organic substances is important and relevant for several reasons:

1) CO_2 is a major driver of climate change, and its conversion to chemicals through photocatalysis can help reduce atmospheric CO_2 and mitigate the effects of climate change;

2) the production of organic substances from CO_2 can reduce dependence on fossil fuels and other non-renewable resources, making it a sustainable approach to chemical synthesis;

3) photocatalytic conversion of CO_2 is environmentally friendly because it uses light energy and renewable raw materials to produce valuable chemicals without generating harmful by-products or waste;

4) conversion of CO_2 to organic substances can create new economic opportunities and create sources of income while reducing the use of carbon; carbon capture and use;

5) the study of the photocatalytic conversion of CO_2 requires the development of new materials, catalysts, and reaction systems, which can lead to scientific progress in the field of materials science and catalysis.

Decarbonization is the reduction of CO_2 emissions due to the use of energy sources with a low carbon content, achieving a lower emission of greenhouse gases into the atmosphere.

The main examples of decarbonization methods are:

1. the initiative to limit mineral extraction, the main provisions of which are set out in [1] and are based on the calculations of international experts [2], who believe that to slow down global warming, it is necessary to reduce the extraction of coal (61%), oil (36%) by 2030) and natural gas (32%);

2. The reduction of transportation of vehicles based on internal combustion engines is supported by members of the Alliance for Decarbonization of Transport and the Alliance for Zero Emission Vehicles [3], which unites more than 20 countries. According to the analysis of open data [4], by 2025 the share of sales of new cars with internal combustion engines will decrease to 23%. In proportion to this, the demand for oil refining products will decrease;

3. direct air capture technology (Direct-Air-Capture, DAC), based on the extraction of CO_2 from the atmosphere with the help of giant vacuum cleaners. The filter material contains amines - special chemicals that trap carbon dioxide.

4. artificial photosynthesis is the process of using artificial systems to produce energy using sunlight. Artificial photosynthesis occurs similarly to natural photosynthesis in plants. Artificial photosynthesis uses photocatalysts - substances that can absorb light energy and use it to induce chemical reactions. The catalyst in this reaction is TiO_2.

In the process of photocatalytic reaction, under the influence of light, photocatalysts become active and able to initiate chemical transformations. This process can lead to the synthesis of complex organic compounds.

Due to the photocatalytic conversion of CO_2, the production of renewable fuels and chemicals is possible. It has been established that TiO_2 in the form of anatase and rutile is the most common CO_2 photocatalyst. In both cases, the photocatalytic conversion of CO_2 involves the absorption of light energy to create electron-hole pairs, which can then react with CO_2 to form various products.

CO_2 recycling through artificial photosynthesis has several ecological aspects that are promising for environmental decarbonization:

- reduction of greenhouse gas emissions;
- use of renewable energy;
- reduction of dependence on fossil resources;
- reduction of environmental pollution;
- closing the global carbon cycle.

The substances formed - methanol, acetate aldehyde and acetone are promising substances for the use and production of biofuels. Methanol can be used as a direct fuel for specialized engines or as a raw material for the production of other fuel products such as dimethyl ether (DME).

Acetaldehyde can be converted into butanol, which can serve as a substitute for gasoline. Butanol has a high energy content and can be used in standard engines without significant modifications. Acetone is a promising substance for the production of propanol, which can be used as an alternative to gasoline or an additional fuel for blending with gasoline.

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БІОРІЗНОМАНІТТЯ ЯК ОСНОВА ПРИРОДНО-ЗАПОВІДНОГО ФОНДУ

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Біорізноманіття (або біологічна різноманітність) визначається в Конвенції про біологічне різноманіття (CBD) як мінливість серед організмів з усіх джерел включно наземні, морські та інші водні екосистеми та екологічні комплекси яких вони є частиною; воно включає різноманітність усередині видів, між видами та екосистемами. [1] Тобто це різноманіття живих організмів, їхніх генетичних компонентів та екосистем, що вони складають. Це включає в себе різноманіття видів рослин, тварин, грибів, бактерій та мікроорганізмів, а також різноманіття генетичних ресурсів в межах кожного виду.

Біорізноманіття може бути описане на трьох рівнях:

1. Генетичний рівень: це різноманіття генів і генетичних варіантів в межах кожного виду. Генетична різноманітність є основою еволюції та дозволяє організмам адаптуватися до змін у середовищі.
2. Видовий рівень: це різноманіття різних видів організмів, які існують в певному регіоні або на певній території.
3. Екосистемний рівень: це різноманіття різних екосистем та типів середовищ, включаючи природні, напівнатуральні та антропогенні.

Біорізноманіття є критично важливим для підтримання стабільності та функціонування екосистем.