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«Investigation of nanofiber material production by catalytic pyrolysis»

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Introduction

- At the moment, the processing of associated gas is insufficiently studied. There is no solution for environmental utilization of associated gases. At the moment, most of the gas is burned, about 35 million tons. This leads to an annual loss of 180 billion rubles. and, at the same time, to annual emissions of CO2 of about 50 million tons, which in turn leads to the oxidation of atmospheric nitrogen.
- To date, there are several methods for handling gaseous hydrocarbons, based on reaction equipment, in order to obtain CNM (carbon nanomaterials). As a result, you can get products such as: various composites, parts in electronics, electrode materials, catalyst carriers, etc. However, the existing equipment currently has a number of disadvantages that do not allow the production of CNM on an industrial scale.

Comparative analysis

Methods for obtainingCNM:

1. Flow-through, two-chamber reactor with a microwave source (magnetrons).
2. Electrocracking.
3. Methane pyrolysis.

The most effective method is thermochemical destruction (pyrolysis) of gaseous hydrocarbons.

Production of carbon nanofibers

The gas consumption is 100 l/h per gram of catalyst. The temperature in the reactor is in the range of 600±50 °C. The catalyst is heated in a liquid hydrogen environment. After uniform distribution of the catalyst in the reactor, the raw material is heated and decomposed into final products. Nanofiber is formed on the catalyst particles (Figure 1), there are also impurities mainly in the form of amorphous carbon, and it is also possible to form graphite and metal catalyst particles.

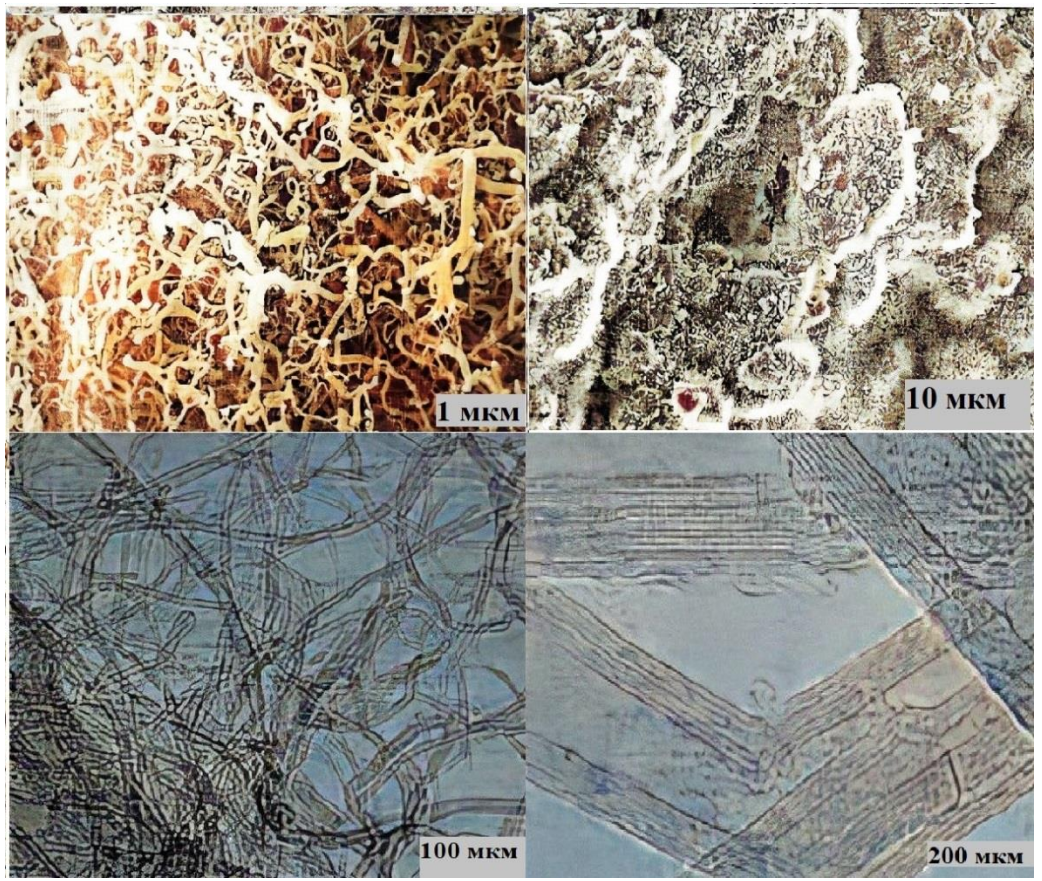

Figure 1. Structure of nanofiber samples under a microscope

Conclusions

Studies indicate the prospects of using the method of pyrolysis of associated gas to obtain a STU a comparative analysis of catalysts used to get the STU Also has the optimum catalyst for the reaction of pyrolysis. The most productive catalyst for the effective reaction has been established. The results of studies on the production of carbon nanofibers based on nickel catalysts are presented.

Contacts

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