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BIOGAS PURIFICATION METHODS

Morozova E. D., Sshivnova V. S., students
Scientific supervisor – Belskaya H., Ass. Professor,
Zelianukha A., Senior Lecturer
Engineering Ecology Department
Belarusian National Technical University
Minsk, Republic of Belarus

Biogas is a mixture of methane, carbonic acid gas, sulphuretted hydrogen, hydrogen and other substances. Biogas purification and refinement are relevant in order to increase the efficiency of biogas using for energy production and reducing its impacts on the environment.

The content of methane in biogas is primarily determined by following criteria:

– process technologies (compliance with metagenesis conditions, absence of harmful compounds in the substrate);

– the temperature of the fermentation process (anaerobic digestion of biomass takes place with the most efficiency at the average temperature 35–40 ºC; at higher temperature, the quantity of methane released into the reactor is lower, this is due to the difference in solubility of carbonic acid gas CO2 and methane CH4).

The enrichment of biogas with biomethane demands special upgrading technologies. The main aim of upgrading is removing of sulphuretted hydrogen (H2S), carbon dioxide (CO2) and water from biogas. Content of H2S in biogas may reaches till 3 %. This chemically active gas leads to acid corrosion of metallic surfaces. The water content reduces the heat of combustion of the biogas.

Both traditional methods (chemical purification, absorption, adsorption) and modern methods (membrane separation, cryogenic separation and biological purification technologies) can be used to purify biogas. Disadvantages of purification technologies can be overcome by combining them into united technologies. Thus, the combination of membrane separation with aqueous absorption, chemical purification or cryogenic separation is more effective than these methods individually at the expense of low operating costs, high CO2 and H2S absorption, higher methane purity levels and lower energy consumption.