

바이오가스 정제 및 고질화 기술 현황 및 전망

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The Present and the Future of Biogas Purification and Upgrading Technologies

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Anaerobic digestion(AD) has successfully been used for many applications that have conclusively demonstrated its ability to recycle biogenic wastes. AD has been successfully applied in industrial waste water treatment, stabilisation of sewage sludge, landfill management and recycling of biowaste and agricultural wastes as manure, energy crops. During AD, i.e. organic materials are decomposed by anaerobic forming bacteria and finally converted to excellent fertilizer and biogas which is primarily composed of methane(CH₄) and carbon dioxide(CO₂) with smaller amounts of hydrogen sulfide(H₂S) and ammonia(NH₃), trace gases such as hydrogen(H₂), nitrogen(N₂), carbon monoxide(CO), oxygen(O₂) and contain dust particles and siloxanes. The production and utilisation of biogas has several environmental advantages such as i) a renewable energy source, ii) reduction the release of methane to the atmosphere, iii) use as a substitute for fossil fuels.

In utilisation of biogas, most of biogas produced from small scale plant e.g. farm-scale AD plant are used to provide as energy source for cooking and lighting, in most of the industrialised countries for energy recovery, environmental and safety reasons are used in combined heat and power(CHP) engines or as a supplement to natural. In particular, biogas to use as vehicle fuel or for grid injection there different biogas treatment steps are necessary, it is important to have a high energy content in biogas with biogas purification and upgrading. The energy content of biogas is in direct proportion to the methane content and by removing trace gases and carbon dioxide in the purification and upgrading process the energy content of biogas is increased.

The process of purification and upgrading biogas generates new possibilities for its use since it can then replace natural gas, which is used extensively in many countries, However, those technologies add to the costs of biogas production. It is important to have an optimized purification and upgrading process in terms of low energy consumption and high efficiency giving high methane content in the upgraded gas.

A number of technologies for purification and upgrading of biogas have been developed to use as a vehicle fuel or grid injection during the passed twenty years, and several technologies exist today and they are continually being improved. The biomethane which is produced from the purification and the upgrading process of biogas has gained increased attention due to rising oil and natural gas prices and increasing targets for renewable fuel quotes in many countries. New plants are continually being built and the number of biomethane plants was around 100 in 2009.

Key words : Anaerobic digestion(혐기성소화), Biogas(바이오가스), Renewable fuel(재생연료), Purification(정제), Upgrading(고질화), Biomethane(바이오메탄), Carbon dioxide(이산화탄소)

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