

Biogas Upgrading Process using a Thermophilic Hydrogenotrophic Methanogen,
Methanothermobacter sp. BS-12

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Renewable electricity utilization is expanding worldwide, and uneven production of wind and solar energy can temperately result in excess electricity supply in power grid. This surplus can be used to electrolyze water to produce H₂. Nevertheless, H₂ as fuel presents some drawbacks related to its low volumetric energy content and difficulty in storage and transport. Biological biogas upgrading, coupling the H₂, produced by water electrolysis, with the CO₂ in biogas and converting it to CH₄, has been recently reported. In this study, we isolated a suitable microorganism, named *Methanothermobacter* sp. BS-12, for bio-methanation process from the anaerobic digester in a wastewater treatment plant, Seoul, and confirmed its characteristics. *Methanothermobacter* sp. BS-12 is a thermophilic methanogen utilizing CO₂ and H₂ as substrates to produce CH₄. To maximize its growth and methanation performance, the pH, temperature, amounts of trace metals and concentration of NaCl were investigated. Also, we proceeded genome sequencing and identified the methane production pathway and related genes.