

Biogas purification performance of new water scrubber packed with sponge carriers

Author:

Roslan Noorain, Tomonori Kindaichi, Noriatsu Ozaki, Yoshiteru Aoi, Akiyoshi Ohashi

Keyword: Biogas purification, Hydrogen sulphide, Methane upgrading, Polyurethane sponge Carrier, Water scrubbing technology

Abstract:

Water scrubbing technology is applied to biogas purification to obtain useful gas. However, it is difficult to produce highly purified gas of sufficient quality under typical operational conditions without imposing external pressure. Here, we propose a new water scrubber packed with sponge carriers instead of conventional packing materials, which has the advantage of increased hydraulic retention time for the scrubbing water. The results of biogas purification experiments indicate that the proposed scrubber can perform high purification even under atmospheric conditions. An artificial biogas of 60% methane is purified to more than 90% methane with no hydrogen sulfide detected; this quality level is acceptable for use as city gas. In addition, a mathematical model to simulate the purification phenomenon is constructed. Simulation experiments reveal that a high hydraulic retention time is very effective for good performance. We also found that the flow ratio of biogas to scrubbing water is the most crucial among the various operational parameters governing the purification performance.