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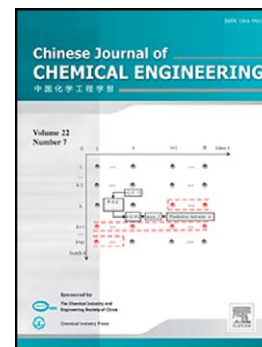
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Energy, Resources and Environmental Technology

Effect of endogenous hydrogen utilization on improved methane production in an integrated microbial electrolysis cell and anaerobic digestion: Employing catalysed stainless steel mesh cathode[☆]

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ABSTRACT

Improving the production of methane, while maintaining a significant level of process stability, is the main challenge in the anaerobic digestion process. Recently, microbial electrolysis cell (MEC) has become a promising method for CO₂ reduction produced during anaerobic digestion (AD) and leads to minimize the cost of biogas upgrading technology. In this study, the MEC-AD coupled reactor was used to generate and utilize the endogenous hydrogen by employing biocompatible electrodeposited cobalt-phosphate as catalysts to improve the performance of stainless steel mesh and carbon cloth electrodes. In addition, the modified version of ADM1 model (ADM1da) was used to simulate the process. The result indicated that the MEC-AD coupled reactor can improve the CH₄ yield and production rate significantly. The CH₄ yield was enhanced with an average of 48% higher than the control. The CH₄ production rate was also increased 1.65 times due to the utilization of endogenous hydrogen. The specific

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