

能源和环境工程

接种污泥预处理对生物制氢反应器启动的影响

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收稿日期 2007-7-20 修回日期 2008-1-15 网络版发布日期 2008-5-9 接受日期

摘要 采用3个相同的EGSB反应器,以糖蜜废水为底物,分别对取自污水处理车间集泥井的缺氧污泥进行曝气预处理和加热预处理,通过与不经任何预处理的接种污泥(对照反应器)的启动试验进行对比,在其他启动控制条件相同的情况下,研究了接种污泥不同预处理对EGSB生物制氢反应器启动的影响。结果表明,与对照反应器相比,经过适当预处理的活性污泥接种至生物制氢反应器有利于反应器的高效快速启动,产氢微生物得到了有效的富集,在启动末期反应器各项指标均优于对照反应器。启动末期,接种污泥经过适当预处理的反应器,酸化率较未经预处理的反应器提高了10%~30%;产氢量提高了1.69~1.82倍。考虑到降低生物制氢的工业化应用成本及提高系统可操作性,本研究推荐应用曝气预处理方法对生物制氢反应器的接种污泥进行预处理,以获得其高效快速启动。

关键词

[生物制氢](#) [EGSB反应器](#) [污泥](#) [预处理](#) [启动](#)

分类号

Comparative study of influence of inoculating sludge with different pre-treatments on start-up process in EGSB bio-hydrogen producing reactor

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Abstract

Three parallel lab-scale expanded granular sludge bed (EGSB) reactors were employed to evaluate the start-up process of bio-hydrogen production from molasses wastewater. With other start-up parameters controlled the same, the effect of inoculating sludge pre-treatments was studied. Two methods of pre-treatments (pre-heating and pre-aeration) were conducted for the inoculating sludge in two reactors compared with a non-pre-treatment reactor (control reactor). The results showed that the reactors with pre-treatment performed better in the start-up process than the control one. The hydrogen-producing bacteria were efficiently enriched at the start-up period, shortening the start-up process. At the end of the start-up stage, the acidification rate of the pre-treatment reactors was 10%—30% more than the control one, and hydrogen production increased by 1.69—1.82 times. Considering cost and feasibility, the authors suggest applying the pre-aeration method to treat the inoculating sludge to get more efficient start-up in the industrial scale bio-hydrogen production plant.

Key words

[hydrogen production](#) [EGSB reactor](#) [sludge](#) [pre-treatment](#) [start-up](#)

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