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内循环厌氧反应器流动模型及反应过程模拟

The study of flow model and reaction process simulation of inner circulation anaerobic reactor关键词: [厌氧反应器](#) [流动模型](#) [反应过程模拟](#)基金项目: [浙江省科技厅资助项目\(No.2009C32084\)](#)

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摘要: 为揭示内循环厌氧反应器放大过程中所出现的规律,本文对反应器中流动模型和反应过程进行了模拟研究,通过对主反应区的停留时间分布的实验研究,确定了主反应区流型可用一平推流与两个并联的全混流进行串联的三参数组合模型进行模拟.在实验范围内,平推流区所占的体积分数约为36%,两个全混流区所占的体积分数分别为53%和11%.结合厌氧反应动力学方程,应用组合模型模拟了实际反应器的状态,并和实验值进行了对比,发现反应器出口处CH₄体积流量最大误差为9.67%,在可允许的范围内.同时,模拟了基质初始COD和温度变化对反应器出口状态的影响.研究表明,与其它模型相比,组合模型计算简洁,同时又有较好的精度,能够满足反应器的设计需要.

Abstract: To reveal the mechanism in the amplification of internal circulation anaerobic reactor, research was conducted to focus on the simulation of the flow model and reaction process. Through the experiment of the residence time distribution in the main reaction zone, it can be confirmed that the flow in the main reaction zone can be simulated with a three-parameter model, which is connected with a plug flow type and a full mixed model combining with two parallel series. In the experimental range, plug flow zone occupies the volume fraction of about 36%, and two full mixed zone occupies the volume fraction rates are 53% and 11%. According to anaerobic reactor kinetics equations, application portfolio model has simulated the real state of the reactor and does comparison with the experimental values. The maximal error of CH₄ volume flow from the reactor outlet can be 9.67%, in an allowable range; At the same time it also simulates the influence of the matrix initial COD's concentration and temperature changes on the state of the reactor outlet. Compared with other models, the combined model is simple in calculations, and also has high accuracy to meet the needs of the reactor design.

Key words: [anaerobic reactor](#) [flow model](#) [reaction process simulation](#)

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