

邓仁健,张金松,杨靖波,曲志军·高无机悬浮物进水对城市污水厂处理效果的冲击影响及机理研究[J].环境科学学报,2013,33(6):1605-1610

高无机悬浮物进水对城市污水厂处理效果的冲击影响及机理研究

The effect of high inorganic suspended solids shock loading on full-scale WWTP removal performance

关键词: [高无机SS](#) [冲击负荷](#) [MSBR工艺](#) [工艺对策](#)

基金项目: [深圳水务\(集团\)有限公司自选课题;国家自然科学基金\(No.51174090\)](#)

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摘要: 针对我国南方城市污水厂经常出现的高无机悬浮物(SS)负荷冲击问题,在分析其进水水质特性的基础上,研究了高无机SS负荷冲击对活性污泥系统的污泥特性、污泥活性、出水水质和去除效率等方面的影响.结果表明:高无机SS负荷冲击条件下,剩余污泥的含水率会变小,排量是主要的控制参数,应减小冲击初期剩余污泥排放体积;活性污泥的硝化速率、反硝化速率、释磷速率和吸磷速率分别比正常情况下降了30.5%、36.7%、35.0%和28.1%;COD去除效率不会改变,SS、TN和 $\text{NH}_4^+\text{-N}$ 的去除效率会降低,但能够提高TP的去除效率.研究结果可为制定相应的工艺对策和措施奠定基础.

Abstract: The effect of high inorganic suspended solids shock loading on activated sludge characteristics, sludge activity, effluent quality and removal efficiency of a full-scale municipal wastewater treatment plant was studied based on analysis of the influent water quality in a wastewater treatment plant in south China. The experimental results showed that the water content of surplus sludge decreased under high inorganic suspended solids shock loading, and the surplus sludge was the main parameter. Therefore, the discharge of surplus sludge volume should be reduced on the early stage of the shock loading. The nitrification rate, denitrification rate, phosphorus release rate and phosphorus uptake rate decreased by 30.5%, 36.7%, 35.0% and 28.1%, respectively, comparing to normal conditions. The COD removal efficiency kept constant the SS, TN and $\text{NH}_4^+\text{-N}$ removal efficiency were reduced, and the TP removal efficiency was improved under the same condition. The process and countermeasures including improving the gas/water ratio, adjusting the SBR tank run model, reducing the sludge discharge volume and the sludge dewatering without coagulant could improve the removal performances of the activated sludge system. The result of the study could be used as a basis for solving the problem of high inorganic suspended solids shock loading.

Key words: [high inorganic suspended solids](#) [shock loading](#) [modified sequencing batch reactor\(MSBR\)process](#) [process countermeasures](#)

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