

序批式活性污泥法处理毛皮废水的研究

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摘 要 采用序批式活性污泥法处理毛皮模拟废水的试验条件为: 水温 20℃, DO 2mg/L, COD_{Cr} 1500mg/L, BOD₅ 900mg/L, MLSS 2100mg/L, 经 4h 曝气反应后, COD_{Cr} 浓度降到 100mg/L 左右, BOD₅ 浓度降到 40mg/L 左右, MLSS 从 2100mg/L 增至 2600mg/L 左右. 试验结果表明, 采用限制曝气方式运行的序批式活性污泥系统最不易发生污泥膨胀.

关键词 序批式活性污泥法, COD_{Cr}, BOD₅, MLSS, 限制曝气, 污泥膨胀

土畜产加工厂毛皮废水主要来自浸水、脱脂、脱肉、浸酸、鞣制等工序. 废水的 COD_{Cr} 为 800—1000mg/L, BOD₅ 517—836mg/L. 试验用水是在多次分析毛皮废水特性的基础上配制的. COD_{Cr} 为 1500mg/L 左右, BOD₅ 为 900mg/L 左右, SVI 为 50—75ml/g, pH 为 7.0—7.8. 本研究采用序批式活性污泥法处理该种废水, 试验经污泥培养、驯化、条件试验、稳定运行, 历时半年.

1 试验装置与方法

如图 1 所示, 试验装置为有机玻璃圆柱体,

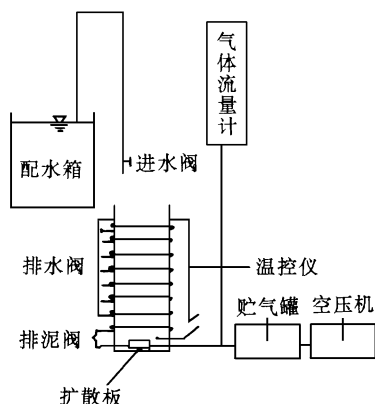


图 1 降解废水有机物间歇反应器

容积 14.3L. 由于序批式活性污泥法工艺流程简单, 不需二沉池与污泥回流设备等, 反应器作

为曝气池兼二沉池. 圆柱体底部安装圆盘式空气扩散板, 压缩空气由空气压缩机经过保持恒压的贮气罐通过扩散板曝气, 起到充氧与混合搅拌作用. 反应器的一侧沿纵向设置了 10 个排放取样口, 以供采样分析、排水与排泥用. 为了使曝气运行时反应器内的溶解氧浓度维持在 2mg/L 左右, 反应器上装有气体流量计.

试验用活性污泥采自哈尔滨制革厂活性污泥.

试验按限制曝气方式运行, 即反应器进水过程中不曝气, 直到反应器液相中有机物浓度达到出水水质要求为止^[1-2]. 停止曝气后反应器作为二次沉淀池进行泥水分离和污泥浓缩, 然后排出上清液, 最后排放剩余污泥, 完成一个运行周期(之后再进水). 研究表明, 限制曝气方式运行时最不易发生污泥膨胀.

2 结果与分析

2.1 COD_{Cr}、BOD₅、MLSS 的变化规律

培养适宜于降解毛皮废水的活性污泥, 1 个月后活性污泥完成成熟, 各项指标稳定. COD_{Cr}、BOD₅、MLSS 随时间的变化规律如图 2 所示. 从图 2 可以看出, 在起始 COD_{Cr} 浓度为 1500mg/L 左右, 大约经 2h 曝气, 反应器中的 COD_{Cr} 浓度降到 250mg/L 以下, BOD₅ 浓度降

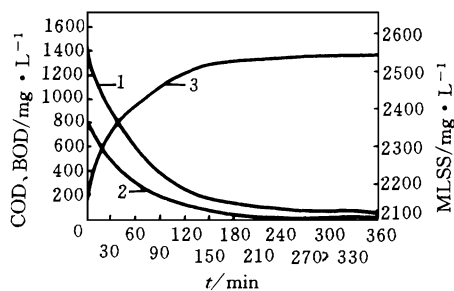


图2 COD、BOD、MLSS 随时间变化曲线

1. COD 2. BOD 3. MLSS

到 120mg/L; 大约 4h 后 COD_{Cr} 浓度便可降至 100mg/L 左右, BOD_5 浓度降到 40mg/L 左右. 污泥浓度从 2100mg/L 左右增至 2600mg/L 左右. 由此可见, 有机物比降解速率^[3]与污泥比增长速率^[4]都较大. 试验还表明, 污泥浓度在 3500mg/L 以下时, 提高污泥浓度虽然不能增大有机物比降解速率, 但能缩短反应时间, 提高单位容积的降解速率, 减少反应器的有效容积, 节省基建费用; 序批式活性污泥法的另一优点是污泥不需要回流, 污泥沉降性能好, 因此很容易维持较高的污泥浓度, 而不受回流污泥浓缩程度及回流比的制约. 由此可见, 序批式活性污泥法具有简易、快速、低耗等特点.

2.2 SVI 值的变化规律

在序批式活性污泥处理系统中, 处理水和污泥的分离是极其重要的一个环节, 而且一般以污泥容积指数 (SVI)^[5] 作为表示污泥沉降性能的指标. SVI 值能较好地反应出活性污泥的松散程度和凝聚、沉淀性能. SVI 随曝气时间的变化如图 3 所示.

从图 3 可以看出: SVI 值随时间波动范围不大, SVI 值略呈下降趋势, 且 SVI 值随时间变化幅度越来越小. 反应前期, 由于底物降解速度较快, 所以 SVI 值的变化幅度相对较大, 后期底物降解速度较慢, SVI 值也趋于平稳.

2.3 pH 值的变化规律

pH 值随时间变化规律如图 4 所示.

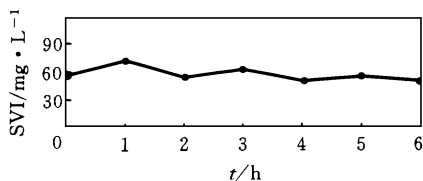


图3 SVI 随时间变化曲线

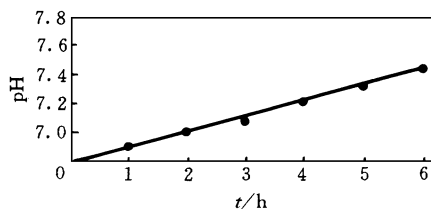


图4 pH 随时间变化

从图 4 可以看出, pH 值随着时间的延续而呈上升趋势, 而且变化比较明显. 导致 pH 值升高的原因是, 水中的氢离子与碱分解产生的氢氧根离子发生中和反应.

3 结 论

(1) 采用高有机负荷运行方式, 在相同反应时间条件下, 增大间歇反应的起始污泥浓度, 可以提高有机物去除效率或减小反应器有效容积.

(2) 本试验测定的 SVI 值变化幅度较小, 说明试验过程中污泥沉降性能基本稳定. 因此, 间歇反应中, 序批式活性污泥法最不易发生污泥膨胀.

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in lab.. $0.01\text{m}^3/\text{m}^3$ SO_2 is absorbed in a glass absorber with liquor of manganese waste slag. Under the condition of solid-liquid ratio $\text{SO}_2:1:5$, pH 1.8—2.2 and SO_2 absorption efficiency

90%, $\text{MnSO}_4 \cdot \text{H}_2\text{O}$ has been produced by primary crystallization of the absorption mother liquor. The products analysed have a purity of 94% $\text{MnSO}_4 \cdot \text{H}_2\text{O}$.

Keywords: sulfur dioxide, manganese waste slag, wet desulphurization.

Research of Large Gangue Content Cement.

Xu Bin et al. (Dept. of Material Science, Southwest Institute of Technology, Mianyang 621002): *Chin. J. Environ. Sci.*, **18**(6), 1997, pp. 61—62

By means of activator, a kind of large gangue content cement was obtained, which gangue content is 60% and R_{28} is up to 49.6 MPa. The physical property such as normal consistency water demand, setting time and soundness of cement can meet the standard. The hardened cement has lower porosity of $0.0413\text{cm}^3/\text{g}$ and lower hydrate heat which is $253\text{kJ}/\text{kg}$.

Keywords: large gangue content cement, activator, physical and mechanics property, porosity, hydrate heat.

Study on a Dye Adsorption Made from Waste Asbestos Friction Materials.

Zhao Yuming et al. (State Key Lab of Pollution Control and Resource Reuse, Dept. of Environ. Sci. and Eng., Nanjing Univ., Nanjing, 210093): *Chin. J. Environ. Sci.*, **18**(6), 1997, pp. 63—65

A kind of new adsorbent was made from waste asbestos friction materials. The static adsorption capacity for cation yellow X-5GL is $159.68\text{mg}/\text{g}$ in its aqueous solution which chromaticity is 50000, and the adsorption capacity for cation blue RL is $79.68\text{mg}/\text{g}$ in its solution which chromaticity is 5000. The treating amount for waste water generated in the dyeing process from woolen textile factory can be as high as $280\text{ml}/\text{g}$. This adsorbent can also effectively adsorb reactive dye, and can be easily regenerated through aftertreatment when saturated adsorption is reached.

Keywords: asbestos friction materials, adsorption, cation dye, reactive dye.

Study on the Treatment of Skin Wastewater by Sequencing Batch Reactor. Zhu Shuqin et al. (Qiqihar Environ. Protection Sci. Research Institute, and Qiqihar Environ. Supervision Station, Qiqihar 161005): *Chin. J. Environ. Sci.*, **18**(6), 1997, pp. 66—67

Laboratory studies indicated that experimental conditions: simulating waste water temperature 20°C , DO $2\text{mg}/\text{L}$, COD_Cr $1500\text{mg}/\text{L}$, BOD_5 $900\text{mg}/\text{L}$, MLSS $2100\text{mg}/\text{L}$. After 4 hours period aeration, the COD_Cr dropped toward about $100\text{mg}/\text{L}$, BOD_5 toward about $40\text{mg}/\text{L}$, the concentration of sludge increased from $2100\text{mg}/\text{L}$ to about $2600\text{mg}/\text{L}$. Experimental results showed that sequencing batch reactor system to be operated in a limit aeration schedule can not cause sludge increase rapidly.

Keywords: sequencing batch reactor, COD_Cr , BOD_5 , MLSS, limit aeration, sludge expansion.

GC Analytical Method for Acidic Phosphate Ester.

Deng Nansheng et al. (Dept. of Environ. Sci., Wuhan Univ., 430072): *Chin. J. Environ. Sci.*, **18**(6), 1997, pp. 68—70

Derivation methods of quaternary ammonium salt thermolysis, silanization, methyl iodide-esterification and diazomethane-esterification for acidic phosphate ester were compared in this paper. Results indicated that methyl iodide-esterification is the best derived method. GC quantitative analysis of this method was systematically studied and a simple, quick, precise and high-sensitivity GC analytical method was developed. Percent recovery of P507 is 97.0%—111% and its detection limit is 0.92ng through this method. Percent recovery of P204 is 94.8%—97.8% and its detection limit is 1.33ng . With the establishing of this method, the studies on the behavior of organophosphorus extracting agents especially the acidic phosphates in water-environment reach a new level.

Keywords: organophosphorus extracting agent, acidic phosphate ester, GC, derivation.

Dry and Wet Deposition of Elemental Mercury Measured by Moss Bag near a Mercury Mine.

Tan Hong et al. (Guizhou Research Centre of