

研究论文

光催化氧化法测定地表水化学需氧量的研究

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摘要 用溶胶-凝胶法在石英管上制备了纳米TiO₂膜, 并采用光催化氧化法建立了一种测定地表水化学需氧量(COD)的新方法. 以Ce(IV)作为纳米TiO₂光生电子的接受体, 从而减少了纳米TiO₂光生电子和光生空穴的复合, 提高纳米TiO₂的光催化氧化能力. 以测定Ce(IV)的紫外吸收为手段探讨了光催化氧化测定COD的机理, 考察了测定COD的最佳反应条件. 实验结果表明, 该方法条件温和, 不会造成二次污染, 能够实现地表水等低COD值水样的快速准确测定. 在该实验所选择的条件下, 可准确地测定1.0~12 mg·L⁻¹之间的COD值, 检测限为0.4 mg·L⁻¹.

关键词 [化学需氧量\(COD\)](#) [光催化氧化](#) [纳米TiO₂膜](#) [Ce\(IV\)](#)

分类号

Investigation of Photocatalytic Oxidation for Determination of Chemical Oxygen Demand of the Ground Water

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Abstract A photocatalytic oxidation method for the detection of the chemical oxygen demand (COD) of the ground water using sol-gel-based nano-TiO₂ film, which was coated onto the quartz tube, was proposed. In this method, the photo-excited conduction band electrons released from illuminated nano-TiO₂ film could be easily accepted by Ce(IV) to enhance the activity of photocatalytic degradation of organic compounds. Therefore, the COD of a given sample can be assessed by determination of the change of the concentration of Ce(IV). Under the optimum operation conditions, the determination range of COD was 1.0~12 mg·L⁻¹ and the limit of detection was 0.4 mg·L⁻¹. This method was also applied to the determination of the COD of ground water samples. The results were in good agreement with those from the conventional (*i.e.*, permanganate) COD methods.

Key words [chemical oxygen demand](#) [photocatalytic oxidation](#) [nano-TiO₂ film](#) [Ce\(IV\)](#)

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