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研究论文

Photodegradation of Molasses by a MoO_3-TiO_2 Nanocrystalline Composite Material

Madhukar NAVGIRE, Ajeet YELWANDE, Deepak TAYDE, Balasaheb ARBAD, Machhindra LANDE*

Department of Chemistry, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, (M.S.), 431004, India

Madhukar NAVGIRE, Ajeet YELWANDE, Deepak TAYDE, Balasaheb ARBAD, Machhindra LANDE*

Department of Chemistry, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, (M.S.), 431004, India

摘要 A MoO_3-TiO_2 nanocrystalline composite material was prepared by a simple sol-gel method. The synthesized material was characterized by X-ray diffraction, scanning electron microscopy with an electron dispersion spectroscopy, transmission electron microscopy, and Fourier transform infrared spectroscopy. Melanoidin is a dark brown pigment found in wastewater from the sugar industry and it pollutes water. This polluted water is generally referred to as molasses and it undergoes fermentation and is solely responsible for water, soil, and air pollution. The synthesized catalytic material was found to be effective in degrading molasses under UV-visible radiation. Analysis of treated and untreated molasses was carried out by measuring its color, chemical oxygen demand, biological oxygen demand, pH, and total dissolved solid. Results from these analyses indicate the effective photodegradation of the molasses. This methodology has several advantages such as high photocatalytic activity, non-toxicity, cleanliness, and reusability of the catalytic material.

关键词： sol-gel molybdenum oxide titanium oxide photodegradation molasses pollution control

Abstract： A MoO_3-TiO_2 nanocrystalline composite material was prepared by a simple sol-gel method. The synthesized material was characterized by X-ray diffraction, scanning electron microscopy with an electron dispersion spectroscopy, transmission electron microscopy, and Fourier transform infrared spectroscopy. Melanoidin is a dark brown pigment found in wastewater from the sugar industry and it pollutes water. This polluted water is generally referred to as molasses and it undergoes fermentation and is solely responsible for water, soil, and air pollution. The synthesized catalytic material was found to be effective in degrading molasses under UV-visible radiation. Analysis of treated and untreated molasses was carried out by measuring its color, chemical oxygen demand, biological oxygen demand, pH, and total dissolved solid. Results from these analyses indicate the effective photodegradation of the molasses. This methodology has several advantages such as high photocatalytic activity, non-toxicity, cleanliness, and reusability of the catalytic material.

Keywords： sol-gel, molybdenum oxide, titanium oxide, photodegradation, molasses, pollution control

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