

РЕФЕРАТ

Роботу викладено на 95 сторінках, вона містить 5 розділів, 28 ілюстрації, 22 таблиці і 91 джерело в переліку посилань.

Об'єктом дослідження стали: наночастинки ZnO та TiO₂ та для фотокаталізу під дією ультрафіолетового випромінювання.

Предмет роботи – дослідження структурних, спектральних та оптичних характеристик синтезованих наночастинок та дослідження їх впливу на характеристики фотокаталітичної деградації метиленового голубого.

Метою даної роботи є синтез та дослідження наночастинок напівпровідникових матеріалів, що використовуються як каталізатори у реакції фотокаталізу, та розробка моделі подальшого застосування отриманих матеріалів.

В першому розділі подано огляд літератури, в якому розглядаються базові характеристики матеріалів ZnO та TiO₂ та теоретичні основи методів їх синтезу.

В другому розділі роботи наведено огляд літератури щодо принципів фотокаталізу, різних типів фотокаталізаторів, та порівняння фотокаталітичних властивостей TiO₂ і ZnO.

В третьому розділі досліджено найпоширеніші застосування матеріалів TiO₂ і ZnO, такі як: очищення стічних вод, фотоелектрохімічна система розщеплення води на водень і кисень (PEC) та сенсibiliзовані барвником сонячні елементи (DSSCs).

В четвертому розділі наведений синтез наночастинок ZnO та TiO₂. Проведено порівняльну характеристику методів та отриманих результатів структурних, спектральних та оптичних характеристик, а також наведено приклад застосування отриманих матеріалів в системі DSSC.

В п'ятому розділі було представлено розробку стартап проекту.

ДИОКСИД ТИТАНУ, ОКСИД ЦИНКУ, ФОТОКАТАЛІЗ,
НАНОЧАСТИНКИ, DSSC

ABSTRACT

The work presented on 95 pages contains 5 sections, 28 illustrations, 22 tables and 91 sources in the list of references.

ZnO and TiO₂ nanoparticles for photocatalysis under the UV illumination were the object of the study.

The subject of the work - is the study of structural, spectral and optical characteristics of synthesized nanoparticles, and their impact on the characteristics of photocatalytic degradation of methylene blue.

The purpose of this work is to investigate synthesis methods to make nanoparticles of semiconductor materials which used as catalysts in the photocatalysis reaction, and investigation of the model of its further use.

The first chapter provides an overview of the literature, which examines the basic characteristics of ZnO and TiO₂ materials and the theoretical foundations of their synthesis methods.

The second section of the work reviewed literature on the principles of photocatalysis, various types of photocatalyst, and a comparison of photocatalytic properties of TiO₂ and ZnO.

In the third chapter of this work, the most common applications of TiO₂ and ZnO materials are investigated, such as: wastewater treatment, photoelectrochemical water splitting system (PEC), and dye-sensitized solar cells (DSSCs).

In the fourth section, the synthesis methods of ZnO and TiO₂ nanoparticles are provided. The comparative characteristics of the methods and obtained results of structural, spectral and optical characteristics are carried out. Also, this chapter offers an example of the use of the obtained materials in the DSSC system.

In the fifth chapter the development of a startup project was presented.

TITANIUM DIOXIDE, ZINC OXIDE, PHOTOCATALYSIS, NANOPARTICLES, DSSC

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