PREPARATION AND CHARACTERIZATIONS OF NANOHYBRID TiO_2/ZnO

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TABLE OF CONTENTS

ABSTRACT

PREPARATION AND CHARACTERIZATIONS OF HYBRID NANO–TiO_2/ZnO.

In this study, we report on preparation and characterizations of hybrid nano-TiO_2/ZnO using sol-gel spin coating techniques. The study involved of modification band-gap energy of Titanium dioxide (TiO_2) at different precursor molecular concentration of Zinc oxide (ZnO). The FESEM (Field emission scanning electron microscope) morphological characterize shows TiO_2 and ZnO particle produced at nanoscale size. The compositional of both particles confirmed using EDAX (Energy Disperse Analyzer X-ray) analysis. The XRD (X-Ray diffraction) characterize measured the structural properties of anatase and rutile for TiO_2 as well as zincite for ZnO. We have found with increasing ZnO molecular concentration, the crystallite size, d were decreased until the optimum sample, ratio of 4 TiO_2: 1 ZnO, with value of 23.71 nm. For UV-VIS (Ultra-Violet/Visible Spectroscopy) measurement, we found the optical band-gap increased with increasing ZnO molecular concentration. The optical band-gap for optimum sample was 3.38 e.V represented this study has successfully improved the optical band-gap of TiO_2. Hence, these results suggest for window solar tint film, coating mirror application and coating paint application.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Nanotechnology is actually the science of atoms where it is the smallest molecules related to at the nanometer scale, roughly about 1 and 100 molecular diameters. At this scale, the fundamental properties of materials are determined and can be engineered. The most important application produces from nanotechnology development is production of a new class of catalysts known as nanocatalysts. The latest and on-going research about significant advances are contributing to the production and better understandings of their nature like composition, particle size, and structure and the role of this nanocatalysts in chemical reactions. The changes in particle size would greatly affect their surface morphology, surface to volume ratio, and electronic properties of materials, hence the optical and chemical properties of the materials also have a huge changes.

Todays, the leading research has reach into a new level where a new proposed has been introduced to hybrid a nanomaterial. Hybrid material is a material that includes two moieties blended on the molecular scale. Commonly, one of these compounds is inorganic and the other one organic in nature. It is believed and proved that hybriding at least two molecule that different but have similarities in