A.V.V.M. Sri Pushpam College (Autonomous)
Poondi– 613 503, Thanjavur-Dt, Tamilnadu
(Affiliated to Bharathidasan University, Tiruchirappalli – 620 024)

3.7.1 Number of Collaborative activities per year for research/ faculty exchange/ student exchange/ internship/ on –the-job training/ project work

Collaborating Agency:

Dr. P. K. Praseetha Head, Department of Nanotechnology, Noorul Islam Centre for Higher Education Kumaracoil, Kanyakumari.

Dr. K. Ravichandran
Associate Professor & Head
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AVVM Sri Pushpam College (Autonomous)
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Dr. P. K. Praseetha
Head
Department of Nanotechnology
Noorul Islam Centre for Higher Education
Kumaracoil – 629180, Kanyakumari Dt.

Date: 13.06.2019

LINKAGE

For the year 2019-2020

Between

1. Dr. K. Ravichandran
Associate Professor & Head
PG & Research Department of Physics
A.V.V.M Sri Pushpam College
(Autonomous), Poondi – 613 503.

&

2. Dr. P. K. Praseetha
Head
Department of Nanotechnology
Noorul Islam Centre for Higher Education
Kumaracoil – 629 180, Kanyakumari Dt.

Considering the significance of the noble cause for the student community, we have come forward to collaborate with each other to exchange research knowledge, expertise, laboratory and library facilities to the process of scientific research and education in the field of materials science. The parties (mentioned above as 1. & 2.) have had preliminary discussion in this matter and have ascertained areas of broad consensus. The parties now therefore agreed to enter in writing these avenues of consensus, under a flexible linkage, and this project aims to fill the gap between knowledge demand and subject expertise related to the mentioned field.

Joint Responsibilities

- Sharing of laboratory facilities, library resources, database etc.,
- Joint Publication of research articles, books, magazines, bulletins etc.,
- Jointly organizing conferences, seminars, symposia and workshops.
- Submitting joint proposals for research funding from agencies like UGC, CSIR, DST and TNSCST.

Dr. K. Ravichandran 13/6/19.

Dr. P. K. Praseetha 13/6/19

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Combined effect of Cu and N on bandgap modification of ZnO film towards effective visible light responsive photocatalytic dye degradation

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ABSTRACT

This article focuses on the deposition of ZnO, ZnO:N, ZnO:Cu and ZnO:Cu:N thin films using nebulizer spray technique towards the decomposition of textile dyes through photocatalysis. The observed individual optimum doping concentrations of Cu (0.5 wt %) and N (3 wt %) were chosen for the preparation of co-doped films. As doping partners of ZnO, Cu and N result in better outcome when they are used together as co-dopants rather than used individually. The band gap values were found to be decreased from 3.39 (undoped ZnO) to 3.17, 2.94 and 2.58 after N, Cu and Cu:N doping, respectively as observed from the optical study. The dopant induced band gap modifications estimated for the samples using optical transmittance data are correlated with the enhancement in the photocatalytic dye degrading efficiency. Results obtained from XRD, SEM, optical and XPS studies are correlated suitably with the photocatalysis results. The mechanism behind the enhancement of degrading efficiency has been discussed in this paper with the support of structural, compositional, optical and surface morphological analyses.

1. Introduction

Photocatalysis is one of the best proven ways for degrading toxic organic dyes [1]. Zinc oxide (ZnO) - a semiconductor - is used as one of the best cost effective photocatalysts by several researchers for this purpose. However, the ability of ZnO is comparatively lower considering its dye decomposition efficiency under visible light [2–6]. Therefore, research activities are under progress in various laboratories all over the world to enhance the efficiency of ZnO. Doping of certain transition metals and non-metals with ZnO is one of the effective ways to achieve this goal.

In the present study, copper (one of the suitable transition metals) [7,8] and nitrogen [9] (one of the effective non-metal ions) are added as dopants separately and also jointly with ZnO to improve the photocatalytic efficiency of ZnO. The selection of these dopants is based on the literature which shows that the addition of these elements facilitate.

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