OPTICAL SENSING MATERIAL BASED ON HYBRID SOL-GEL/PVA FOR CADMIUM DETECTION

NURUL FARAHIDORA BINTI JAAFAR

Final Year Project Report Submitted in
Partial Fulfilment of the Requirement for the
Degree of Bachelor of Science (Hons.) Chemistry
in the Faculty of Applied Sciences
Universiti Teknologi MARA

JANUARY 2016

This Final Year Project Report entitled "**Optical Sensing Material Based on Hybrid Sol-gel/PVA for Cadmium Detection**" was submitted by Nurul Farahidora Binti Jaafar, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry, in the Faculty of Applied Sciences and was approved by

_____

Wan Elina Faradilla Binti Wan Khalid
Supervisor
School of Chemistry and Environmental Studies
Faculty of Applied Sciences
Universiti Teknologi MARA
Pekan Parit Tinggi, 72000 Kuala Pilah
Negeri Sembilan

_____ _____

Tn. Sheikh Ahmad Izaddin Bin Sheikh Mohd Ghazali
Project Coordinator
School of Chemistry and Environmental Studies
Faculty of Applied Sciences
Universiti Teknologi MARA
Pekan Parit Tinggi, 7200 Kuala Pilah
Negeri Sembilan

Mazni Binti Musa
Programme Coordinator
School of Chemistry and Environmental Studies
Faculty of Applied Sciences
Universiti Teknologi MARA
Pekan Parit Tinggi, 72000 Kuala Pilah
Negeri Sembilan

Date : _____

TABLE OF CONTENTS

ABSTRACT

OPTICAL SENSING MATERIAL BASED ON HYBRID SOL-GEL/PVA FOR CADMIUM DETECTION

In this study, Alizarin Red S (ARS) reagent was used to detect cadmium (Cd^{2+}) in free solution and immobilization form. For free solution, six parameters has been studied, effect of pH, effect of reagent concentration, photostability, dynamic range, reproducibility and interferences. ARS complex showed maximum absorption at 424.50 nm and pH 6. Photostability of ARS reagent showed RSD value of 1.77 %. The reproducibility gives RSD values of 1.23 % and 2.89 % for the concentration of 1 ppm and 5 ppm, respectively. ARS gave linear response in the cadmium concentration range of 0 – 5 ppm. For the immobilization form, five parameters that have been studied were the effect of ARS loading amount in the sol-gel, observation on the different transparency film, leaching test, photostability and reproducibility. Hybrid sol-gel/PVA film was able to produce good film compare to pure sol-gel and PVA film. Photostability of ARS reagent showed RSD value of 2.19 %. The reproducibility gave RSD values of 29.72 % and 20.39 % for cadmium concentration of 5 ppm and 10 ppm respectively.