

آلافة

قال تعالى: (وَعِنْدَهُ مَفَاتِيحُ الْغَيْبِ لَا يَعْلَمُهَا إِلَّا هُوَ وَيَعْلَمُ مَا فِي الْبَرِّ وَالْبَحْرِ وَمَا تَسْقُطُ مِنْ وَرَقَةٍ إِلَّا يَعْلَمُهَا وَلَا حَبَّةٍ فِي ظُلُمَاتِ الْأَرْضِ وَلَا رَطْبٍ وَلَا يَابِسٍ إِلَّا فِي كِتَابٍ مُبِينٍ).

صدق الله العظيم [الأنعام: ٥٩].

Dedication

To dear mother.

To dear father.

Especial Dedicate to my brother, Dr. Mubarak

To all my brothers, I dedicate this research

To my colleagues comrades the trail

To my teachers.

To all those who loved me honestly, and I love them equally.

Acknowledgements

Thanks first to Allah, and thanks go to the family that did not skimp me something to complete this work, and especially thank supervisor of this research Dr. Rasha Abdulhaiy, and Dr. Eissa Ismail, and Dr. Faiz Mohammed Badr. and also Thanks to the family college of Science, represented to in sections of physics and chemistry, and also Thanks to the teacher Ramadan from the family of college laboratories and medical sciences, Thanks also to the family of Africa city of technological Represented the family of Nano science Laboratory, And thanks also to my colleagues comrades the trail, Thanks also for each of the financially or cognitively contributed to the completion of this research modest.

Abstract

In this study, the optical properties, in particular absorption coefficient and transparency of Linear Low Density Polyethylene (LLDPE) doped with Zinc Oxide nano particles were investigated within different weight percent namely (0, 5, 10, 15,20% wt) was prepared , using diode laser (915 nm ,80mW) and (820nm,200mW) with different power were used to investigate the absorption coefficient and transparency of LLDPE with each weight percent adding of ZnO nanoparticles, The results indicates that the ZnO / LLDPE nanocomposites after some improvement may be used as good mechanism to reduce the intensities of high power laser which using medical, industrial ,engineering ,and research fields (laser attenuator).

الخلاصة

في هذا البحث تمت دراسة الخصائص الضوئية (النفاذية ومعامل الامتصاص) للبولي إيثيلين من النوع منخفض الكثافة الخطي بعد ادخال اوكسيد الزنك في حجم النانو وبنسب مئوية مختلفة (0,5,10,15,20%) وقد تم التحقق من هذه الخصائص باستخدام ليزر الثنائي بطول موجي (915nm, ٨٠mW) و (٨٢٠ nm, 200mW) وبقدرات مختلفة وقد اشارت النتائج الي تغير واضح في كل من النفاذية ومعامل الامتصاص مع اضافة كل نسبة من اوكسيد الزنك ومن هذه النتائج يمكن اقتراح مزيج البولي اثلين من النوع منخفض الكثافة الخطي /اوكسيد الزنك في حجم النانو كآلية فاعلة في تقليل شدة ليزرات القدره العاليه المستخدمة في المجالات الطبية والصناعية والهندسية ومجالات البحوث.

List of Figures

Figure No.	Title	Page No.
2.1	Chemical structure of pure polyethylene	5
3.1	ZnO/LLDPE nanocomposites	17
3.2	Devices used in the experiment	19
4.1	Relation between intensity of transmitted beams(I_t /mA) of diode laser (915nm),80mW and ZnO nano particles concentration	22
4.2	Relation between the Transparency and ZnO nano particles concentration using diode laser(915nm),80mW	22
4.3	Relation between the absorption coefficient and ZnO nano particles concentration using diode laser(915nm),80mW	23
4.4	Relation between intensity of transmitted beams(I_t /mA) of diode laser (820nm),200mw and ZnO nano particles concentration	24
4.5	Relation between the Transparency and ZnO nano particles concentration using diode laser(820)nm,200mw	25
4.6	Relation between the Transparency and ZnO nano particles concentration using diode laser(820)nm,200mw	25

List of Tables

Table No.	Title	Page No.
2.1	Physical properties of linear low density polyethylene (LLDPE)	6
2.2	Basic physical properties of ZnO	12
3.1	The technical specification of Diode laser 200mw	18
4.1	measurements of absorption coefficient and transparency of LLDPE/ ZnO nanocomposites were carried out using diode laser 915nm,80mw	21
4.2	measurements of absorption coefficient and Transparency of LLDPE / ZnO nanocomposites. Using Diode Laser820nm,200wm	24

Contents

Subject	Page No.
الآية	I
Dedication	II
Acknowledgements	III
Abstract	IV
الخلاصة	V
List of Figures	VI
List of Tables	VII
Table of contents	VIII-IX
Chapter 1:Introduction	
1.1 Metal oxide and polymer nanocomposite material	1
1.2 Research objectives	2
1.3 Research organization	3
Chapter 2 : polyethylene/metal oxides nanocomposites	
2.1 polyethylene	4
2.1.1 Linear low-density polyethylene (LLDPE)	5
2.1.1.1 Production and properties	5
2.1.2 Polymer nanocomposites	6
2.2 metal oxide nanoparticles	7
2.2.1 Synthesis of metal oxide nanoparticles	9
2.2.1.1 Condensed Phase Methods	9
2.2.1.2 Gas-Phase Methods	9
2.3 Zinc Oxide nanoparticles	10
2.3.1 Brief overview of ZnO	10
2.3.2 Fundamental properties of ZnO	11

2.3.2.1Crystal structure of ZnO	11
2.3.2.2Optical properties	11
2.3.3 Synthesis of ZnO nano particles	12
2.3.4 Application of ZnO nano particles	13
2.4 Optical properties of LLDPE/ZnO Nanocomposites	14
Chapter 3 : Experimental part	
3.1 Materials	15
3.2 Methods	15
3.2.1 Synthesis of ZnO nanoparticles	15
3.2.2 Preparation of ZnO/LLDPE nanocomposites	16
3.2.3 Characterization methods	18
Chapter 4 : Results and Discussions	
4.1 Results	21
4.2Discussion	26
4.3Conclusion	27
4.4Recommendations	28
References	29-31