

Figure – 5 : The influence of different weight of the copolymer on

Figure - 6 : The influence of different weight of the copolymer on tensile strength of specimens.



Figure - 4 : The influence of different weight of the copolymer on compressive strength of specimens .









Figure -3: The influence of different weight of the copolymer on impact strength of specimens .



Poly(Aceglutamide-co- Formaldehyde) resin

Figure-1: The chemical reaction to prepared Poly (Aceglutamideco – formaldehyde) resin .

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Table -3: Compressive strength measurements .

Weight of copoly-	Cross Sectional Area	Force	Com-
mer(gm)	(mm2)	(N)	pressive
			Strength
			(Mpa)
0.2	200	2840	28.4
0.4	200	3110	31.1
0.6	200	3430	34.3
0.8	200	3750	37.5
1.0	200	4000	40

Table- 4 : Flexural and tensile strength measurements .

Weight of copoly-	Flexural Strength	Tensile
mer (gm)	(Mpa)	Strength
		(Mpa)
0.2	163	7528.113
0.4	171	7696.462
0.6	198	7815.395
0.8	220	7982.06
1.0	250	8150.41



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Physical Properties	Values
Average Molecular Weight (Mw)	4380 gm/mole
Viscosity	108 cp.
Gel time	3 – 5 Min. at 25C⊛
На	7.8

Table -1: Some of the physical properties of the prepared resin .

Table - 2 : Impact Strength measurements .

Weight of copoly-	Cross Sectional Area (Impact En-	Impact
mer	mm2)	ergy	Strength
(gm)		(Joule)	(Mpa)
0.2	200	3.21	30.5
0.4	200	3.56	33.0
0.6	200	3.72	36.5
0.8	200	3.95	38
1.0	200	4.23	45





methylol groups in the back-bone of the wood cellulose; Those linkages was branched, and that got strong interpenetrating between the adhesive and wood surface.

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Studying the effect of a new polyamide as adhesive for woodwood surfaces which experiment in the Holly Karbala



surfaces of wood to be adhered are brought together, the adhesive materials were transfers to both surfaces equally. The adhesive then penetrates in to the wood surfaces establishing complete contact between the adhesive and wood surfaces. During wetting, the adhesive develops an extensive and intimate molecular scale contact with wood surface. Wetting occurs to some extent during all the previous steps. Finally during hardening, the adhesive film sets and develops cohesive strength; and the adhesive bonding process begins with interpenetrating of the copolymer in the cellulose fiber of the wood and then some types of bonds will be formed between the active site of the prepared copolymer and wood cellulose which are rich in CH2OH groups; They are capable to formed ether linkages and hydrogen bonds with the polar groups of the prepared polyamide.

Conclusions

The influence of the (Aceglutamide – co – Formaldehyde) copolymer, shows high values of mechanical behavior as adhesive for wood – wood surfaces, compared with the values of the (Urea – Formaldehyde) and (Melamine – Formaldehyde) resins [13] , which used as adhesive for same surfaces; That interesting results can be due to the present of polar groups in the back-bone of the prepared copolymer, like (CO-NH) amid, (COOH) carboxylic acid and (CH2OH) methylol groups; which linkages with the (CH2OH)





4. Preparing of specimens

The dimensions of the specimens wood were cut according to standard tests were used in this work . Different weight (0.2, 0.4, 0.6, 0.8 & 1.0 gm) of the polymeric material respectively, were coated between the surface of specimens wood after added the hardener of resin to get cross linking copolymer and left the specimens to 24 hours to post dry (curing) . Three samples were prepared for each standard test.

Result and Discussion

As showed in Tables 2 to 4 and Figures 3 to 6, the mechanical behavior will be increasing with increased of the weight of the prepared copolymer which coated between surfaces of wood; the impact strength was 45 MPa, the compressive strength was 40 Mpa , the flexural strength was 250 Mpa and the tensile strength was 8150.41 Mpa for 1.0 gm from the prepared copolymer were used as adhesive; These values will be decreasing with decreases of the weight of the prepared copolymer . These results can be explained by formed of the strong linkages between the polar groups in the prepared copolymer and the CH2OH groups in the lignin of wood . That linkages will be formed by five steps in an ideal wood / adhesive bond can be characteristic, which are; flow, transfer, penetration, wetting and hardening. During flow, adhesive applied to the wood surface merges into a uniform wet film . When two Studying the effect of a new polyamide as adhesive for woodwood surfaces which experiment in the Holly Karbala



the PH of solution was adjusted from 7.0 – 7.5 . After 45 Min., stopped heating and cooled the reactants to $80C_{\odot}$. 4N Acetic acid solution were added to the flask reaction and heating the reactants at $130C_{\odot}$ for one hours . The reactant was left to cool at room temperature . Table -1, obtained some of the physical measurements of the prepared copolymer, and Figure – 1, represent the chemical reaction to prepared Poly (Aceglutamide- co – formaldehyde) resin . Figure -2, represent the FT-IR spectrum of the prepared copolymer, and showed the appearance of a strong sharp band at 3300 cm-1 for stretching (-NH) and strong broad band at 3500 cm-1 for stretching alcoholic (-OH) with stretching (H – bond), and the spectrum also showed the aliphatic (C-H) at approximately 2860 cm-1 and the spectrum also showed a strong sharp band at 1050 cm-1 and 1600 cm-1 for a stretching band (C-N) and (C=O) amide respectively .

3. Standard Tests

a- ASTM: D-790 [9] : The measurement of flexural strength, by three point method .

b-ASTM: D-695 [10] : The measurement of compression strength.

c- ISO - 179 [11] : The measurement of impact strength .

d- ASTM: D-638 [12] : The measurement of tensile strength .





hesive must, therefore, be applied in the liquid state and with sufficient pressure that it will flow into the small crevices of the solid surface[7] .

In this work, preparation of the new copolymer from Aceglutamide and Formaldehyde to formed a new amide resin, and studying some of the mechanical properties of this new resin as adhesive for wood-wood surface.

Experimental Part

1.Materials

a- Aceglutamide; trade name is (Acutil-S), in crystals form, imported from BDH Co.

b- Formaldehyde; 37%, imported from Fluka Co. .

c- Hexamethylenetetramine; as a hardener for the prepared resin, Purity 99.9%, imported from BDH Co..

d- All chemicals were used to prepare of the copolymer imported from BDH Co. .

2. Preparation of the copolymer [8]

One mole Aceglutamide, was dissolved in 10 mole Ethanol absolute in 1Liter four-necked flask equipped with mechanical stirrer, reflux condenser and thermometer . Two moles Formaldehyde and 0.5N Sodium hydroxide solution, were added to the flask reaction and the temperature of solution was maintained at 110C. and





Introduction

Very large quantities of adhesives are being used in the aeronautical, ship building and poly wood industries[1], when maximum adhesion and bonding strength are required coupled with resistance to that, water and attack by moulds, fungi and bacteria [2]. There are two main types of adhesives [3]; Those natural based adhesives, such as, Casein and Starch; Those based on synthetic resins, such as, Urea-formaldehyde, Phenol-formaldehyde, Melamine- formaldehyde, etc. , having good adhesive strength and considerable degree of elasticity and flexibility.

An adhesive is defined as a substance capable of holding materials together by surface attachment [4]. Each adhesively bonded joint is a system of two similar or dissimilar solid materials called substrates or adherents, joined by layer of another material called the adhesive [5]. Most of the modern adhesives are composed of various components, one of these components are base, this material from which the adhesive derives, its specific name like; Epoxy, Polyester, Polyurethane, etc.; It is usually a solid material that serves as the back-bone of the adhesive [6]. Because the function of an adhesive is to join two solids together, it must be able to make intimate contact with each surface and spread freely upon them, i.e. it must be capable of wetting the surfaces. The ad-



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Keyword

Adhesive ; Adhesion ; Amide Resin ; Chemical Modification; Modified Copolymer ; Formaldehyde Resin ; Copolyamide ; Copolymer ; Copolymerization .

الملخص

تم في هذا البحث تحضير بولي أمايد مشترك جديد من تفاعل edimatulgecA مع الفورمالديهايد بواسطة عملية الأسترة ، وأستخدام هذا البوليمر المشترك كلاصق بين سطوح خشب – خشب . خمسة أوزان مختلفة (2.0 ، 6.0 ، 6.0 ، 8.0 و 0.1 غرام) من البوليمر المشترك المحضر على التوالي ، أستخدمت كلاصق لتحضير عينات خشب / لاصق .

أربعة طرق قياسية ، أستخدمت لقياس الخواص اللصوقية وهي :D : MTSA : 097 - 0 ، D:MTSA- 056 ، OSI : 056 و D:MTSA- 036 .

تم استخدام كميات من هذا الراتنج تطبيقا في ثلاثة ورش نجارة في محافظة كربلاء المقدسة في منطقة (عكد النجارين) ولمدة ستة اشهر واعطت نتائج جيدة عند استخدامها عمليا في تصنيع الأثاث الخشبي .

النتائج التي تم التوصل اليها تشير الى أن عينات خشب / لاصق الحاوية على 0.1 mg من البوليمر المشترك المحضر يمتلك قيم عالية في جميع الأختبارات القياسية ، قوة الصدمة 54 aPM ، قوة الأنضغاط 04 aPM ، قوة الأنحناء aPM 252 و قوة الشد 14.0518 aPM ، مقارنة مع العينات الأخرى الحاوية على أوزان أقل من البوليمر المشترك المحضر .

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Abstract

In this research, a new polyamide was prepared from reaction Aceglutamide with Formaldehyde by esterfication process, and used this copolymer as adhesive between wood – wood surface. Five different weights (0.2, 0.4, 0.6, 0.8 & 1.0 gm) from the prepared copolymer respectively were used as adhesive to prepare the specimens of wood / adhesive. Four standard test methods were used to measured the adhesion properties which are; ASTM: D-790, ASTM: D-695, ISO – 179 & ASTM: D-638.

This adhesive has been used of large quantities of this resin applied in three carpentry workshops in the province of holly Karbala in the area (Ekd carpenters) for a period of six months and has given good results when used in practice in the manufacture of wooden furniture.

The results obtained from these tests indicated that, the specimens of wood / adhesive containing 1.0 gm from the prepared copolymer have high values in all standard tests; Impact strength was 45 MPa, Compressive strength was 40 MPa, Flexural strength was 250 MPa and Tensile strength was 8150.41 MPa; compared with the other specimens which contain on less weight from the prepared copolymer.

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Studying the effect of a new polyamide as adhesive for wood– wood surfaces which experiment in

the Holly Karbala دراسة تأثير بولي أمايد جديد كلاصق لسطوح خشب – خشب، والتي جربت في كربلاء المقدسة

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> أ.م.د محمد ناظم بهجت البياتي جامعة كربلاء كلية التربية للعلوم الصرفة قسم الكيمياء العراق / كربلاء المقدسة

and then putting them in their right way and positions which it deserves through evidence.

- the cultural society: local, national and international should be acquainted with the treasures of Karbala' heritage and then introducing it as it is.

- to help those belonging to that heritage race consolidate their trust by themselves as they lack any moral sanction and also their belief in western centralization. This records a religious and legal responsibility.

- acquaint people with their heritage and consolidating the relation with the decendants heritage, which signals the continuity of the growth in the decedents mode of life so that they will be acquainted with the past to help them know the future .

- the development with all its dimensions: intellectual, economic, etc. Knowing the heritage enhances tourism and strengthens the green revenues.

And due to all the above, Karbala' Heritage journal emerged which calls upon all specialist researchers to provide it with their writings and contributions without which it can never proceed further.

Editorial & Advisory Boards

once more because it is Karbala', that part of Iraq full of struggle and still once more because it is that part that belongs to the east, the area against which aggression is always directed. Each level has its degree of injustice against its heritage, leading to its being removed and its heritage being concealed; it is then written in shorthand and described in a way which does not actually constitute but ellipsis or a deviation or something out of context.

3-According to what has just been said, Karbala' Heritage Centre belonging to Al-Abbas Holy Shrine set out to establish a scientific journal specialized in Karbala' heritage dealing with different matters and aiming to: -the researchers viewpoints are directed to studying the heritage found in Karbala' with its three dimensions: civil, as part of Iraq and as part of the east.

- Watching the changes, the alternations and additions which show duality of the guest and luxury in Karbala' geographic area all through history and the extent of the relation with its neighbours and then the effect that such a relation has, whether negatively or positively on its movement culturally or cognitively.

- having a look at its treasures: materialistic and moral

And as much as the observer of the heritage of a particular culture is aware of the details of its burden as much as he is aware of its facts i.e. the relation between knowing heritage and awareness of it is a direct one; the stronger the first be, the stronger the second would be and vice versa. As a consequence, we can notice the deviation in the writings of some orientalists and others who intentionally studied the heritage of the east especially that of the Muslims. Sometimes, the deviation resulted from lack of knowledge of the details of the treasures of a particular eastern race, and some other times resulted from weakening the knowledge: by concealing an evidence or by distorting its reading or its interpretation.

2- Karbala': it is not just a geographical area with spatial and materialistic borders, but rather it is materialistic and moral treasures constituting, by itself, a heritage of a particular race, and together with its neighbours, it forms the greatest heritage of a wider race to which it belongs i.e. Iraq and the east. And in this sequence, the levels of injustice against Karbala' increase: once, because it is Karbala' with all that it has of the treasures generating all through history and

Issue Prelude 'Why Heritage ? Why Karbala?

1- Human race is enriched with an accumulation both materialistic and moral, which diagnoses, in its behaviour, as associative culture and by which an individual's activity is motivated by word and deed and also thinking; it comprises, as a whole, the discipline that leads its life. And as greater as the activity of such weights and as greater their effect be as unified their location be and as extensive their time strings extend; as a consequence, they come binary: affluence and poverty, length and shortness, when coming to a climax.

According to what has been just said, heritage may be looked at as a materialistic and moral inheritance of a particular human race, at a certain time, at a particular place. By the following description, the heritage of any race is described:

- -the most important way to know its culture.
- the most precise material to explain its history.
- the ideal excavation to show its civilization.

writing are the same as those given and followed as suggested in the journal due to the fact that the outcomes of the award are the incomes of the journal.

The researches winning will be edited in the forthcoming issues of the journal and will be referred to as being awarded winners as a sort of honour for their writers and also writings.

This is not the last window (look) but rather the members of the two boards through the financial and moral abilities of the centre activate and encourage all that is of advantage for specialist researchers.

May Allah , the Most High , bless

every effort to vary the ways of communication without limiting it to traditional communication such as waiting for researchers to send their researches , or directly requesting them to write about a certain topic , but rather they varied such ways of communication , the most prominent to which is to announce for (Al- Saqy competition for Academic Researches) ; the following are among the reasons for such an announcement: -To help activate the spirit of competition among researchers through scientific competition of a special-

ized research writing type .

- Enriching the specialized heritage library with new thoughts and viewpoints given by researchers to discover what is new .

-Honouring those deserving honour as encouragement and impetus for recognized researchers and good writings.

It is worth noting that the topics and sections for which the award is given are the five sections of the journal (the Society section the Science section , the Literature section , the Art Aesthetic section and the History section) ; the same conditions of research

Second Issue Word Competition

The Techniques of Researching and Communication Communicating with the research and persuingcommunication is acultural duality which educated societies resort to for improvement and for developing ways of society communicationonall its levels : the naturalistic , the scientific , the practical and else .

It is postulated that this duality makes up an enriching variety for both the public and academic society and at the same time it enriches their built - in variety, through exchanging experiences, exchanging thoughts and the active collective work.

Karbala heritage centre as part of the Islamic and human knowledge affairs department in the Al-Abbas holy shrine through its academic researchand authorized window :I mean Karbala Heritage Journal proceeded further to attract the specialist researchers through communicating with them . Members of the two boards , the advisory and the edition boards made wherefores of the disapproval.

- e. Researches to be puplished are only those given consent by experts in the field.
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- 5. Making an allusion to all sources in the endnotes, and taking cognizance of the common scientific procedures in documentation; the title of the book, editor, publisher,



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