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SYNTHESIS OF TERCOPOLYMER DERIVED FROM VINYL ACETATE, MALEIC ANHYDRIDE AND GLYCEROL

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ABSTRACT

The Tercopolymer of vinyl acetate ,maleic anhydride and glycerol was synthesizes under different reaction conditions. Tercopolymers of vinyl acetate , maleic anhydride and glycerol to make them softer and like as sponge. The obtained Tercopolymer insoluble in common organic solvents such as acetone,benzene,chloroform,carbon tetrachloride etc.Tercoplolymer was characterized by the help of FTIR and Thermo gravimetric analysis (TGA).

Keywords:Tercopolymer,FTIR and TGA.

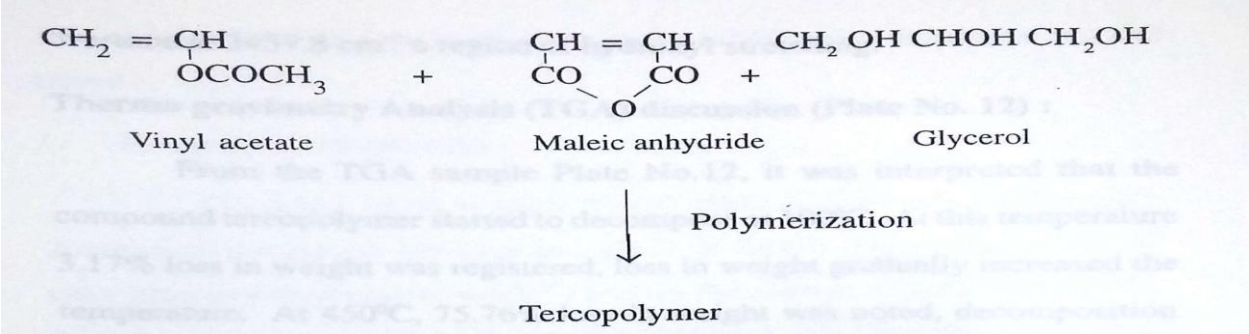
Introduction

Japanese scientist Masamori Yamada[1]1958 prepared a mixture of vinyl acetate8.6,maleic anhydride9.6,BZ_2O_2 0.092 and ethylene glycol diacetate36.8kg,heateded at 80^{o}c for 2hrs to give 16.7kg copolymerized resin in 92%yield ,useful as a sticpasteKobayashi[2]In1972 prepared copolymerization of acrylonitrile with butadiene or vinyl chloride and propylene with butadiene, emphasizing complexes between metal compounds and acrylic monomers,photopolymerization and diels-alder reaction.Dzhafarov[3]in 1984. Prepared a radical tercopolymerization of maleic anhydride with styrene and vinyl acetate was 0.5 order in catalyst and1-3 order in monomer,and

had overall activation energy 21.6 Kcal/mol The polymerization proceeded as binary copolymerization of MA-styrene and MA-VA charge-transfer-complexes.minimum polymerization rate was observed at50 mol % Maleic Anhydride in the monomer mixture.Li,Xiaofang[4] in 1988 polymerisedof Maleic Anhydrid with vinyl acetate initiated with Ultraviolet light of 313 nm.Ter-Coploymer of Maleic Anhydrid and vinyl acetate with acrylonitrile shows that the mole ratio Maleic Anhydrid to vinyl acetate in the polymer is concentrate and equal to 1,irrespective of the feed composition.this supports the complex mechanism for propagation.Flores,M.et al[5]in 1998 synthesised and properties of the (ethylene-vinyl acetate-vinyl alcohol) tercopymer were studied and the reaction with alcohols was conducted on poly (ethylene-vinyl acetate) to obtain tercopolymers with varying hydroxide contents through different routes.mechanical and rheological properties of the tercopolymer were examined as a function of conversion.blends of the tercopolymer with polymide(nylon 6) were prepared for various compositions.Revero,P.et [6]prepared tercopolymer with vinyl chloride,vinyl acetate and maleic anhydride in order to show the use of the equation and the type of information that might be obtained from them.A.K.Pandey[7] et al synthesized the tercoplymer using monomer as vinyl acetate , maleic anhydride and acrylamide for the optimum temperature and better yield.S.K.Kapse et al[8]Synthesed of p-Hydroxyacetophenone Resorcinol and Glycerol terpolymer resin.

Experimental

Vinyl acetate (18ml),malaic anhydride(600mg),AIBN(60mg) and glycerol(12ml) were taken in ampoules, sealed and put to heating onwater bath at 75^0C after 50 minutes most of the monomer of reaction solution was polymerized in solid form after 2 hr of heating the reaction mixture converted into the gum form .After 3 hrs the reaction mixture was polymerized and the tercopolymer were synthesized andcollected in watch glass then it was washed with distilled water for 3-4 times for the removal of impurities ,the tercopolymer like rubbery and spongy. It was put in oven for drying at 70^0C after cooling the tercopolymer was in solid form and the yield of tercopolymerwas 85%.



Result and Discussion

Table:1 Solubilty of Tercoploymer

S.NO	Solvent	Solubility	Remark
1	Acetone	Insoluble	Light white colour
2	Benzene	Insoluble	……..
3	Chloroform	Insoluble	……..
4	Carbon tetra chloride	Insoluble	……
5	Petroleum ether	Slightly soluble	……
6	Water	Slightly soluble	Crushed in small pieces

FTIR

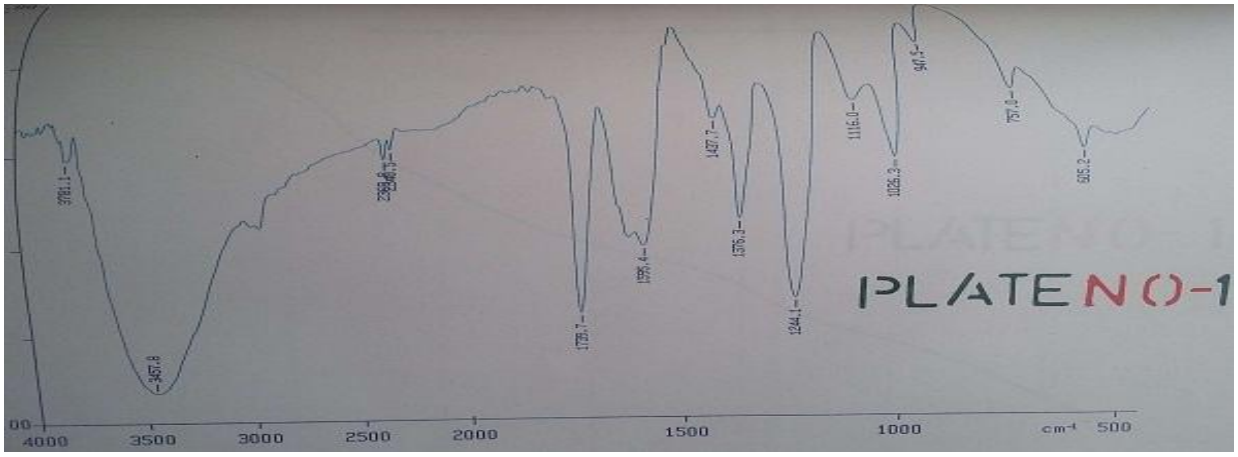


Figure 1:FTIR of Tercopolymer

FTIR spectra of tercopolymer had many peaks.the peak at1026.3cm-1seems of c-o bend of ester group and small peak at 1166.0 cm-1 is probably due to c-o stretching of anhydride.the sharp peak at 1244.1cm-1.a sharp peak in general range for the c=o stretching bends for anhydride.at 1739.7cm-1(1790-1740cm-1) whitch aredue to its asymmetrical and symmetrical stretchings.overtone peak may C=O group since carboxyl stretching is a strong absorption around 1739.7 cm-1 it often gives a noticeable overtone at 3457.8 cm-1 a region of hydroxyl stretching.

Thermo gravimetric Analysis(TGA)

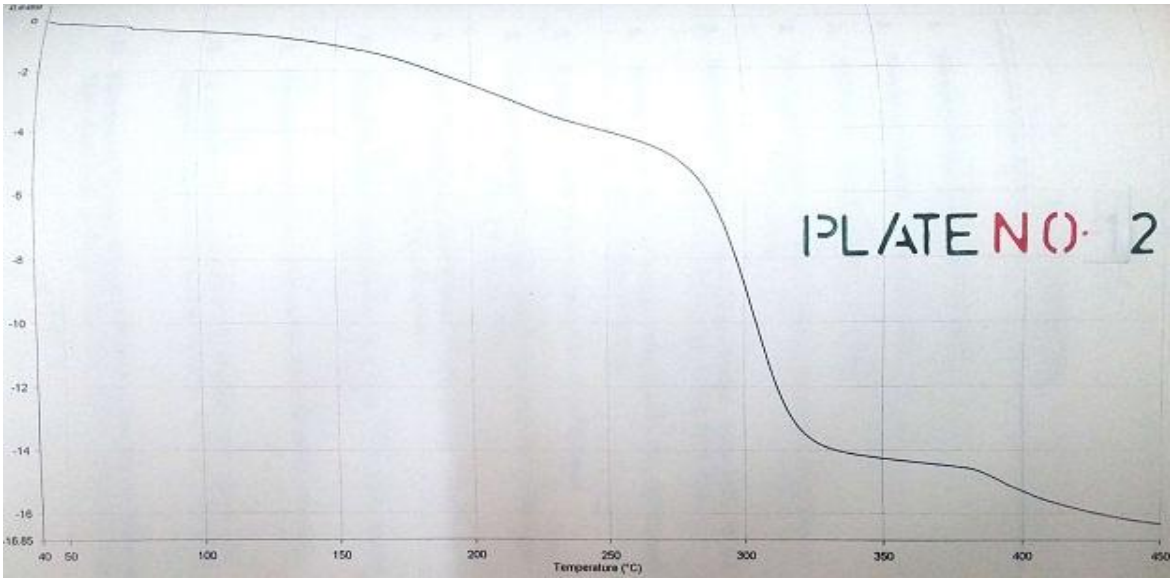


Figure 2 : TGA Thermograms

The Tercopolymer started to decompose at100 ^{0}C at this temperature 3.17%loss in weight was registered, loss in weight gradually increased the temperature. at 450 ^{0}C,75.76%loss in weight was noted, decomposition completed at around 470 ^{0}C.

Table :2 TGA Thermograms of Tercopolymer

S.NO	Temperature(^{0}C)	Weight residue(mg)	Weight loss%(mg)
1	100	96.82	3.17
2	150	92.30	7.69
3	200	86.80	13.19

4	250	80.76	19.23
5.	300	60.556	39.45
6.	350	31.468	68.53
7.	400	28.288	71.83
8.	450	24.238	75.76

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