

Comparison of the Performance of Various Type of Fiber in Epoxy Composite

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ABSTRACT

The aim of this paper to review the past research work on different type of fiber epoxy Composite. Composite are reinforced by waste natural fiber and waste plastic; fiber. Evaluate their raw material properties, Technique, Method Mechanical behavior, morphological observation. Compare Properties between these fiber composite. Whichever fiber epoxy composite are showing best result. We are selected that composite. The effect of various parameter on the performance of composite studied by various researcher composite are made by reinforced material called discrete phase and matrix material called continuous phase. Reinforced material is natural fiber and waste plastic. And for matrix selection epoxy resin is used. Waste natural fiber like jute, sisal, bamboo, coir, banana are renewable, most promises because have low cost, light weight, short growth cycle and high availability, high specific modulus, biodegradability. While waste plastic fiber like polyethylene fiber are nonrenewable used as waste poly fiber and find polymer waste. Due to increasing the mass of polymer waste economical and ecological problem are issued. Whole world is covered by polymer waste mainly sea water and environmental highly polluted. These waste have poor biodegradability. These Kind of reason we are selected waste plastic for control of economical and ecological problem. polymer fiber have satisfactorily diverse properties like low weight, low cost, strength, resistance to various corrosive solutions, and excellent thermal and electrical insulating properties are the features that can be used to obtain innovative composite materials, (polyethylene) fibers for high temperature toughening, and surface functionalized polyethylene (PE) fiber for low temperature toughening These thermoplastic polymers are thermally stable. For such type of fiber composite sample testing conducted by material properties such as tensile strength, Impact strength hardness and structural properties. Thermal properties, surface morphological characteristics.

Keywords: Waste polymer; Epoxy resin; Polymer composite; Mechanical properties

INTRODUCTION

In these review article waste plastic is recycled by polymer industries in the form of light weight fabric wire or yarn. waste plastics is in the form of thermoplastic have most linear or branch polymer is made by soften new shape by relevance of heat and pressure. Due to increasing Intermolecular force throughout the selection of highly glacial polymer. Crystalline melting point is being raise up. So mechanical is maintain at high temperature thus resulting plastic are capable of rival with matrix composite.

Natural fiber is produced by roots, seeds, fruits, leaves. For all plant fiber cellulose is basic forms. Mechanical behavior of natural fiber is various due to cellulose. Plant natural fiber are treated with alkali

treatment for improvement of mechanical properties.

Epoxy resin is used as matrix. Epoxy resin is based on thermosetting polymer. It have 3D cross-linking and highly strong structure.

LITERATURE REVIEW

Literature Survey

Studied on polymer fiber reinforced epoxy composite .In this epoxy resin used with ultra high modulus polyethylene (UHMPE) fiber in the form of yarn or woven. For preparation of composite leaky mould technique are used. Observed the Impact and flexural properties. Hence they conclude inter laminar shear strength of

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UHMPE composite increased by plasma etching of yarn in oxygen atmosphere. UHMPE fiber composite show good tensile and impact properties and poor compressive strength [1].

Studied on hybrid fiber reinforced epoxy composite epoxy polymer are used with carbon fiber and welded wire mesh. Composite prepared plain concrete specimen. Hence they conclude increases the flexural strength 123% over the plain concrete. Using 4 layer wire mesh to be optimum with an increases the ultimate flexural load and load capacity and energy absorption about 88% and 470%. We can find as increases the layer of wire mesh and carbon epoxy and combination of both fiber with increases the layer and thickness, composite properties ultimate flexural load and load capacity increases [2].

Studied on hybrid textile fiber reinforced polymer composite. In this paper epoxy use with two fiber coir and Kevlar in the form of yarn. composite preparation is done by hand lay up technique and for combination of fibers sample is done by woven. Hybrid composite is in the form of coir-coir coir-Kevlar, Kevlar-coir, Kevlar-Kevlar in form of warp and weft. observed the Impact energy of the composite Kevlar- Kevlar is high and coir-coir composite is very low. Flexural strength of composite coir-coir is increases and lowest in Kevlar-Kevlar. Hence they conclude average value for Impact and flexural strength the advantage of coir/kevlar reduce the damage area [3].

In this paper author describes on hemp/polyethylene Terephthalate (PET) hybrid composite epoxy is used with hemp and PET fiber in the form of interwoven. For composite preparation Infusion process are used. we observed warp direction was increased compare to neat woven composite. In these tensile strength of woven and interwoven composite PET/Hemp composite is increased and H/P is lowest. Elastic module P/H is high and H/P is low. Thus we conclude the combination of P/H composite were higher than neat H/H [4].

Studied on natural fiber polymer composite. epoxy is used with Jute fiber and e-glass fiber. For making composite hand lay up method is used. In this paper author compare the mechanical properties between jute fiber epoxy composite with glass fiber epoxy composite for sample testing. Thermo gravimetric analysis method is used for thermal properties analysis. Jute fiber show better properties than neat and glass fiber epoxy composite. For jute composite degradation temperature is increases by TGA analysis [5].

Studied polymer reinforced epoxy composite. epoxy matrix used with thermoplastic polyethylene terephthalate fiber. PET fiber is treated with NaOH. Then strong fiber matrix adhesion is achieved. Surface morphology and chemical properties is determine by SEM method. Composite is prepared at 80c to 12 h in vacuum oven prior. And these composite is compared with neat epoxy resin then fracture behavior and enhance the toughness mechanism are measured by SEM Technique [6].

CHARACTERISTICS OF THERMOSETTING POLYMER

Due to increase the interesting area of fiber polymer composite epoxy resin are widely used as thermosetting matrix. Epoxy have highly mechanical strength, good electrical resistance, good corrosive resistance, good fluids resistance, good chemical resistance. epoxy resin have moderate surface tension and good

adhesion, cracking resistance, epoxy resin have highly cross linked chain due to this reason epoxy have limitation of their intrinsic brittleness.

Nature of epoxy is moderate viscous and high surface tension. Transparent liquid fluid. in surface tension temperature coefficient of epoxy is 0.074 dyne cm-c . and viscosity of epoxy is increases from 100 cps to 1500000 cps (centipoises). If sufficient pressure is applied in fiber then epoxy is properly wet the fiber. epoxy resin have two or more epoxy or ethylene oxide rings. if epoxy resin have two ethylene group then this epoxy is called Diglycidyl Ether Bisphenol -A. This Epoxy Is Selling By Atul India Limited. Recently Work On Novepoxy Dowden 438 Tetraglycidyl Ether 4-4 -Diamino Diphenyl Methane (Tgddm). For making polymer matrix composite [7-9].

For preparation of composite curing agent are very important to making the hard of composite. curing agent are many actuality like polyamine, phenol, thiole but in this report polyamine are used as hardness for curing of epoxy resin. The ratio of epoxy and hardness are used mostly 2 to 1.

Raw material for making fiber: On the basis of literature review it is reported plastic wire natural fiber wire are purchased NAWAB GANJ Kanpur UP.

METHODOLOGY

Hand lay up technique is reported for fabrication of rectangle horizontals and vertical weaving of plastic wire natural fiber wire. weaving have different mesh size like 0 mm, 0.25 mm, 0.5 mm, 7.5 mm, 1 mm block. This Methodology is aged, easily to making fiber weaving, simple to handle and low cost of economic. In this process preparation of composite is done by following step

1. paint the inner surface of mold by lubricant oil.
2. epoxy resin with curing agent is spread on mold surface
3. put weaving fiber sheet and again spread the epoxy resin with hardner above the sheet.
4. epoxy and curing agent have specific ratio. Sufficient pressure is applied by roller over the polymer because of removing the air and polymer matrix filled pore of sheet.

Such that five sample are made with various mesh size for both fiber. Comparing the mechanical properties like tensile strength, impact strength between both fiber. Achieving the excellent properties between fiber.

AIM OF RESEARCH WORK PLAN

To review of these paper, we have been create some idea, to comparison the Mechanical behavior and thermal properties of waste plastic epoxy composite and waste natural fiber epoxy composite. Ruin polymer and waste natural fiber are individually warp and weft in rectangle shape with an assortment of Mesh size. Handloom technique used for producing waste woven sample, Hand lay up technique is used for composite specimens. And The consequence of variation of mesh size of individual fiber epoxy composite of Mechanical properties are compared. The waste fibers are elected as a reinforcement material while epoxy resin are preferred as a matrix. Burning up of waste fiber epoxy composite has been enhance appreciably due to their near to the ground cost and elevated specification of mechanical properties. The waste fibers are polyethylene (plastic wire) and Jute rope.

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