

HYBRIDIZATION OF IN COMPOSITE MATERIALS

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ABSTRACT:- Composite materials are more used in highly demanding Applications where low weight and high Mechanical Performance, Together with chemical resistance and fire/smoke Behaviors, are required. However despite their excellent specific Mechanical properties, their rupture process is, generally Speaking "Catastrophic" i.e. they don't show visible damage prior to rupture. In other words, they don't exhibit plastic behavior, the Engineering safety belt, as most of metals do besides modifying resins, on can be use the hybridization concept where more than Matrix and Fibers can be used. In this paper, we will analyze Fiber hybrid Composite materials in order to be able to enhance a pseudo ductile behavior.

The following are the most Common fiber hybrid Composites:

Interlayer or fiber – by – fiber

Interlayer or yarn – by – yarn.

Interlayer or Layer – by – Layer

Key words:- Hybridization, Composites Materials, Analytical method, Fibers Composite, Chemical Bonding.

INTRODUCTION:

The Composites show the very good strength and stiffness to weight ratios in fibers dominant direction. A pert from the load direction fewer fibers are necessary. This effective possibility to use the materials leads to the very high overall material properties to weight ratio if the stress situation is very Complex and fiber many be loading directions are necessary, the weight shaving in comparison to a metal design is vanishing. if than an efficient light weight design it not Satisfactory to just replaced. Materials with Composite the without Considering the inherent merits and demerits of the materials. Negative aspects of the composite in comparison to metals are their lower damage tolerance bearing behavior Especially laminates with high unidirectional Strength and stiffness are very work related to above mentioned topics. The addition of layers with 90° fibers direction lowers contradictory the strength to weight ratio in the dominated Loading direction. To the minimize the materials effort, the 90° layer are added locally in the load introduction region using a gently inclined ramp- up to minimize the stress peaks. The ramp-up Concept is always associated with unvented bending moments, which-have to be considered in the design process and read to additional weight. Obviously it would result in a great benefit to combine the positive aspects of both materials groups. Fiber metal – laminates (FML) represent an approach to build hybrid material with added strength and Compensated weaknesses one established materials combination is GLARE (glass fiber epoxy composite & aluminum), which is application region lies in modern airplanes in highly fatigue stressed Parts, using the materials plasticity Locally in joining areas one weakness of composite materials. While preserving the high strength and stiffness to weight rations in load direction as in the remaining part. Now thoughts of various Applications of composite Composites Produced using natural and synthetic fiber are utilized for numerous Application such as aviation, marine, sports, furniture, and different Applications. There are studies in progress to durable furniture and new geometrical auxiliary structures and additionally bikes, tricycles and auto bodies. In this the key trust zones are taking after the composite material are short and long haul innovative work. Creation and testing labor preparing specialized bolster administrations for material and proceed procedure determinations, process stream lining and outline product quality improvement keeping in this view a thorough review on the manufacturing Techniques material properties and progressive of natural fiber composite material are studies in this paper.

2. FIBERS COMPOSITES

2.1 Synthetic fibers

Synthetic fibers are kind of man made superior simulated fibers for example, glass alamode and so forth. Contract with natural fibers the expense of synthetic fibers are increasing, on other hand Natural fiber are economical and it don't bring about sensitivity to the human body.



Fig. 1 Natural fiber plants



Fig. 2 Synthetic fibers

In chemistry, orbital hybridizations is the concept of mixing atomic orbital's into new hybrid orbital's suitable the pairing of electrons to form chemical bonds in valence bond theory.

Hybridization:-

SP, SP², SP³, SP³d₁, SP³d₂
Hybridization Orbital's theory

Synthetic fibers are fibers made by human through fiber that are directly derived from living Organisms they are the result of extensive research by scientists to improve upon Naturally Occurring animal and plant fibers.

3. NATURAL FIBERS

Natural fiber is Economical and it doesn't bring about sensitivity to the human body. Favorable circumstances of such fiber over synthetic fibers are more. The properties of Natural fibers composite are expanded by hybridizing Natural fibers with synthetic fibers. Fibers reinforced polymer Composites (FRPCs) are polymer frame work composite imbedded with reinforcement Materials as fibers terms high strength fibers.



Fig. 3 Natural fibers



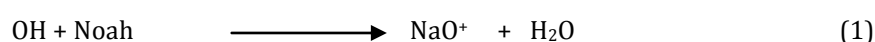
Fig. 4 Natural fibers

composite produced using Natural and synthetic fibers are utilized for human applications for example aviation, marine, games, family unit and different applications there are studies in progress to durable furniture and new geometrical auxiliary structures, and additionally bikes tricycles and auto bodies, utilizing bamboo.

The kenos bust fiber is utilized for cordage and the sails for Egyptian water been rope, twine, protection, attire grade fabric, soil-less preparing blends , creature bedding pressing materials and material that retains oil and fluids, jute, is utilized as binding materials (packs), run, Sponsorship, ropes and yarn. The sisal fibers are discovered financially in a few arrangements: fabric, Strings, strip, wire, rolls and so forth. For brake materials not just astounding tribological properties and Synthetic security required additionally good mechanical properties essential. An adequate quality and harm resilience is of incredible significance because of the well being affectability of the break.

3.2 Treatments of Natural Fibers

Treatment of natural fibers is to be carried out before the use of fibers, frequently treated by method for a Suitable chemical treatment with a specific end goal to adjust the fiber Surface properties. In other words the chemical treatments can be Applied that provided enhance inter facial bond qualities between the fiber and resin matrix. The main purpose is to remove the 'OH' Coating from the natural fibers by means of chemical treatment and to increases fiber surface roughness. A typical example is shown in Equation (1)



3. 3 Summaries the minimum detail where the sole result of Treating the fibers is to remove the impurities and ' OH ' Coating evacuation of the non-cellulosic materials, in organic substance and wax brining about a higher fibers surface roughness.

4. Mechanical Properties of Natural Fiber Reinforced Composite

The core types and specimens influence the flexural behavior, all specimens showed very good energy absorption behavior during bending Tests: the water absorption of the Specimens was significantly reduced by the infiltration of resin inside the core material: Ochi [A] Investigated kenaf/PAL (poly lactic Acid) Composite with different fiber properties Tensile and bending strength as well as young's modulus increased the linearly up to as fiber content of 50%. Pan.et.al, produced. kenaf /PAL Composites by melt-mixing and injection molding with fiber mass Contents raining between 0% and 30%. At- 30% the Tensile strength improve by 30%.

Experimented on tensile and flexural behavior of composite made by reinforcing Johor as a new Natural fiber into polymer resin matrix the samples were prepared up to a maximum volume fraction of approximately 0.40 from the fiber extracted by retting and manual process and compared with established composite like sisal and bamboo. Developed under similar laboratory Conditions Results of this study indicated that using Johor fibers as reinforcement in polyester matrix could be successfully develop a composite material in terms of high strength and rigidity for light weight applications compared to Conventional sisal and bamboo Composite / the material were characterized in term of tensile, compressive, flexural, impact, water absorption Properties and Mechanical behavior. All the mechanical tests showed that alkali treated fiber composite with sand more facture strain than underfed fiber composites. Mei-po.

Investigated on the tensile and flexural behavior of sisal fibers reinforced epoxy composites, the composites were prepared by using hand Lay-up method with 15, 20, 25, and 30% of sisal fiber into epoxy matrix tensile and flexural behavior of sisal fiber reinforced epoxy composites both in unidirectional and mat form are found to be maximum at 30% velmurugan et.al. The mechanical properties of the composites are improved due to the addition of glass fiber along with Palmyra fiber in the matrix. The glass fiber skin-Palmyra fiber core construction exhibits better mechanical properties than dispersed construction.

Investigated and compare the mechanical and thermal properties of raw jute and banana fiber reinforced epoxy hybrid composites. The jute and banana fibers were prepared with yarious weight ratios (100/0 , 75/25 , 50/50 ,25/75 , and 0/100) and then incorporated into the epoxy matrix by molding technique to form composites.

The tensile flexural, impact, thermal, and water absorption test were carried out using hybrid composites samples addition of banana fiber in jute /epoxy composites of up to 50% by weight results. In increasing the mechanical and thermal properties and decreasing the moisture absorption property.

Investigated the performance of mechanical properties of oil palm fiber with glass fiber and used phenol formaldehyde as resin. The investigations revealed that maximum mechanical performance occurs at 40 wt % loading.

CONCLUSION

Natural fibers are playing very important part in the present natural conditions to determine current biological and ecological issues Biodegradable materials are being gives much significance in light of the fact after that after end use arranged off effortlessly without influencing environments. Thus it can be concluded that with methodical and constant Research there will be a good possibility and batter expectations for natural fiber polymer composites on the future composites produced using Natural and synthetic fibers are utilized for numerous Applications, for example, aviation, marine, games, family, unit and different applications.

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