Asian Journal of Applied Science and Technology (AJAST)
(Quarterly International Journal) Volume 3, Issue 4, Pages 79-86, October-December 2019

Effect of Materials Poly Lactic Acid and Chloroform as Filament Adhesive in the 3D Printer Industry

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Article Received: 17 April 2019 Article Accepted: 09 August 2019 Article Published: 24 October 2019

ABSTRACT

Fortunately, this system lacks any technical structural problems and is designed to overcome the problems that have existed in the old adhesives. In older models, in addition to low quality due to the presence of strong chemicals, it can damage the respiratory system and also damage the environment due to its insolubility. In addition to being a simple structure, it is designed to be very precise with its plant base, it has the ability to recharge in the environment, it also does not damage the respiratory system and has high build quality. The system was designed to overcome problems and was designed and Implemented to improve quality, health and environmental protection. The design of this tool, due to the urgency of this process for the environment and the respiratory system, will provide a good market for this product at all 3d printers in the cities for use. It's an Industrial application in chemical engineering as well as chemistry and related to it. The propose of this article is to maximize the use of this adhesive in addition to its many advantages in helping to protect the environment and the use of renewable materials and waste materials that can be used to produce high quality materials and to help the industry.

Keywords: 3D Printer, Materials, Industrial Application, Adhesive, Environment.

Introduction

3D printing and its application 3d printing is a powerful technology that encourages designer to give them unprecedented design freedom, while 3d printing requires fewer tools and thus reduces heavy costs is also with this technology the components can be specially designed and do not need to be assembled with sophisticated geometry and sophisticated features for the machine. Currently, 3d printing has been used in the manufacturing, medical, industrial and cultural sectors to transform 3d printing into commercial technology. 3d printer is a production device that is layered to produce the final components of a 3d computer file (CAD). The first use of a 3d printer was in the production tool room. For example, rapid prototype manufacturing is one of the first applications of 3d printing to reduce the initial time and cost of developing new parts and devices that were previously used only be reducing methods such as CNC milling and grinding is done.

In 2010 manufacturing of the additive began to expand in the manufacturing sector and brought manufacturing into a new phase. 3d printing in the kitchen the 3d food printer is created by layer-by-layer compression of the food in three dimensions. Various types of food such as chocolates, candies, crackers, macaroni and pizza are good choices to produce in this way. 3d printer in design and fashion 3d printing has come into the world of fashion designer and various products such as shoes and clothing have been produced by 3d printer.

In commercial production Nike used a 3d printer to make prototype and make soccer shoes for the 2012 vapor laser talon for American football players. New balance manufactures personalized 3d shoes for athletes. 3d printing and glass manufacturing other uses of 3d printing are for the glasses industry and the manufacture of custom glasses. The 3d printer is very valuable for fashion companies, especially if it becomes a personalized printing tool for buyers. While such changes will not happen soon enough, they will certainly happen and will dramatically change our thinking. 3d printer in automotive 3d printer has been used in the production of cars, trucks and airplanes, incremental design and production: in really 2014, the koeinigsegg plant announced a car called the urbee many of its components made with 3d printer as the first 3d printed car to produce. In 2014, local motors strati unveiled a vehicle using abs plastic and fibro carbons that was fully 3d printed. In May 2015, airbus announced that airbus the new a350xwb contains more than 1,000 pieces produced by 3d printing. In 2015, the royal air force's euro fitter jet flew in with printed pieces. The us air force has begun working with 3d printers and in 2017, Ge aviation revealed that it was using the design to produce an add-on to a 16–seater helicopter engine instead of 900 that had the potential to greatly reduce the complexity of its chains. 3d printing in medicine the use of 3d printing in surgery began in the mid-1990s using anatomical models for bone regeneration surgery planning. Custom implants were developed to expand the use of 3d printing technology in the medical field. Virtual surgery planning and operation guidance using personalized 3d printing tools have been used with great success in many areas of surgery including total joint replacement. Increased production for the production of orthopedic implants (metals) has also increased due to the ability to fabricate porous surface structures. Hearing and dental devices are expected to be the largest area of future custom 3d printer technology in the future.

Surgeons in Swansea use 3d printed parts to reconstruct the face of a motorcycle rider who was seriously injured in a road accident in May 2018, 3d printing was used for kidney transplant to rescue a three-year-old boy. Since 2012, bio-3d printing technology by technology companies B technology and academia have been used to study tissue engineering applications in which organs and body parts are made using inkjet techniques, a recently developed chip-based heart with cell properties matches. 3d printing and especially 3d open source printers are the latest technologies used in the classroom. Some authors claim that the 3d printer offers an unprecedented revolution in stem education. Evidence of such claims has been the ability of students to sample low-cost and high-speed classroom materials as well as build inexpensive quality equipment. 3d heritage and cultural heritage for the past several years, 3d heritage printers have been used extensively for preservation, restoration and dissemination purpose. Many European and north American museums have purchased 3d printers and are recovering their lost artifacts this way. The metropolitan museum of art and British museum use their printers to create souvenirs available in museum shops. Other museums such as the national museum of military history and the Varna historical museum offer their artifacts scanned using the Artec 3d scanner online through the online platform to those who can use the home printer with a 3d printer. Next they print, they put. 3d printers and the production of soft printers are one of the growing applications of 3d printing technology. These operations are suitable for use and adaptation to soft and limb structures, especially in the biomedical sectors and to the development of human-robot interaction. Most of the existing soft operators are built on conventional methods that require manual device manufacturing, assembly and long repetitions to avoid the tedious and time-consuming aspects of current manufacturing processes, researchers are looking for a suitable manufacturing method for efficiently fabricating soft operators. As such 3d printed soft operators are introduced to revolutionize the design and fabrication of soft operators with arbitrary geometrical, functional and control properties in a faster and cheaper approach.

PLA

Poly lactic acid (PLA) is a biodegradable thermoplastic aliphatic polyester derived from renewable source such as cornstarch (in the united states and Canada), cassava root chips or starch (mainly in Asia) or sugar cane (in the rest of the world). In the 6th year of the PLE, it consumed the largest volume of consumption in the world compared to other bioplastic species. One of the biodegradable polymers is produced in a complex two-step process, which first opens the polymerized lactic ring and then repeats this cycle of lactic acid. Recently, we reported the production of poly lactic acid and its copolymers by direct fermentation of Escherichia coli by the synthesis of propionate and PolyHydroxyAlkonate (PHA) using glucose as a carbon source.

When using this originally constructed Escherichia coli an inducible factor is needed to express its engineering genes and to feed the succinate for proper cell growth. Here we use engineering Escherichia coli metabolism to overcome this problem in order to produce more lactic acid and its copolymers. This helps to produce efficient lactic acid and its copolymers without the presence of an inducer. This final recombinant e. coli jixf5 is capable of producing polymers with a molecular weight of 141,000 Daltons up to 20 g / I with %43 polymer content in a chemically defined medium with appropriate ph. Nowadays, the focus of research is on improving the quality of product packaging in the food industry. In this study, some research has been done in this field with the approach of food packaging by poly acrylic acid.

The main use of poly lactic acid packaging is limited to raw food and their shelf life is between three to five days even in refrigerated conditions. The wider application of poly lactic acid to other food products depends on its ability to improve its passage and in particular to reduce the permeability of water vapor and gases. In this regard, three methods of applying polymer, coated polymer and suitable polymer blend to improve proper crossing properties are described. Improving the through put properties of the food packaging is of particular importance so that harmful gases and vapors are introduced into the packaging and the outflow of materials required in the packaging contents is prevented. In the three methods mentioned above, poly lactic acid is the basic packaging material and by implementing different coating or combining it with a suitable polymer, the packaging passage properties are improved. PLA crossing properties oxygen and water vapor permeability, which are critical to the shelf life of food products is not a new polymer PLA. In 1932 carvers produced a low molar mass by heating lactic acid in Vacuo. Subsequent work by Dupont & Ethicon focused on the manufacture of medical sutures, implants and controlled drug release. Generally PLA is based on lactic acid derived from dextrose derived from corn or sugar beet as a raw material for the production of PLA. The continuous improvement of lactic acid fermentation is a major challenge for manufactures. However, poly lactic acid and its copolymers are bio-derived polymers that have excellent properties such as low adaptability and toxicity to humans and are suitable for home products. PLA is a good material for the manufacture of clothing, furniture, carpet, sacks, filtration systems and medical sutures, fractures, dental implants, food preservatives, kitchen utensils and so on.

CHLOROFORM

Ch3cl3 or chloroform whose is a toxic addict and long-lasting respiratory killer.

Application

In the past, chloroform was used as an anesthetic in the operating room. It releases thousands of tons in the Teflon refrigeration and manufacturing industries and is released in nature. It is also used for the preparation of 22 fluorocarbons, seasonings and for the production of tetrafluoroethylene and poly tetrafluoroethylene and other chemicals. It is also used as a solvent, extract preparation, insecticide, preservative and sweetener of medicinal products.

History

Chloroform was discovered by three independent researchers. Chloroform was discovered in 1831 by the French chemist Eugene Soubeiran who produced it form acetone (2-propanone) as well as ethanol through the effect of chlorine bleaching powder (calcium hypochlorite). American physician Samuel Guthrie also produced the compound. Independently, Justus von Liebig did the same.

Harms

Chloroform is one of the most dangerous volatile chlorinated Hydrokines. Breathing, swallowing and exposure to the skin can be harmful. It can cause anesthesia, respiratory paralysis, heart failure and delayed death due to liver and kidney damage.it is sometimes used as an arithmetic. Chloroform cleanses and irritates skin fat. In acute exposure to chloroform, the following symptoms are: headache, nausea, drowsiness, fatigue, confusion, anxiety, inflammation, anesthesia, respiratory failure, freezing and death in anesthesia. Death can be due to respiratory paralysis or heart failure. Chronic exposure symptoms observed include neurological and gastrointestinal symptoms similar to those with alcoholism as well as liver enlargement, toxic inflammation of the liver and accumulation of fat in the liver.

MATERIAL AND METHODS

With the advent of the 3d printing industry the need for high quality materials and adhesives that in addition to being of high quality due to the use of chemicals also prevent the risk of respiratory problems. The claimed invention of a type of adhesive for 3d printer products as well as it is used for gluing equipment that is highly renewable and minimizes damage to the environment due to its plant base. It is also recyclable due to the fact that it has high quality and reduced respiratory damage such an environmentally friendly adhesive actually contains several major components this product is finally achieved. The product generally contains several major components including: Poly Lactic Acid (PLA), CH3CL3 (CHLOROFORM)

This product generally eliminates the usability of 3d printers and attachments and removes problems from its raw materials as well as being renewable.

PURPOSE OF THE EXPERIMENT MAKING FILAMENT ADHESIVE

Procedure

We first light up the laboratory hood and weigh 0.38 g of the PLA sample and place it inside the Beaker using a digital scale that is zero then weigh 0.78 ml of chloroform and weigh on the beaker sample. In the first few minutes of the reaction (about 2 min) the solubilizing reaction begins to soften, mixing with the solvent and soluble stirrer to obtain a uniform solution (5 min) with the thermometer reading (25 °c) then allow the resulting solution to dry to the desired adhesive (half an hour), finally we remove the adhesive from the Beaker wall.

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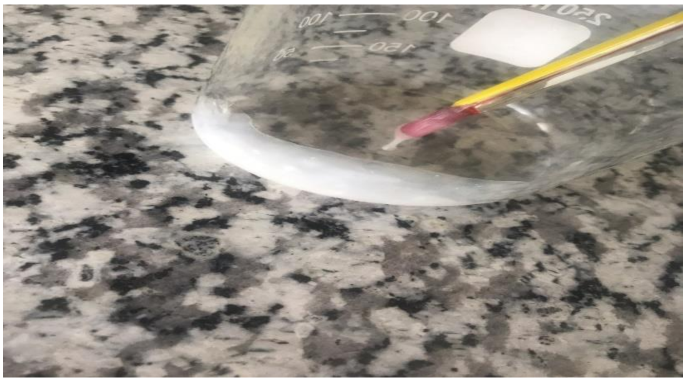
PLA

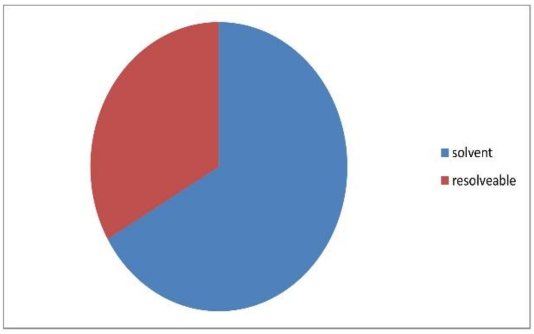
CHLOROFORM

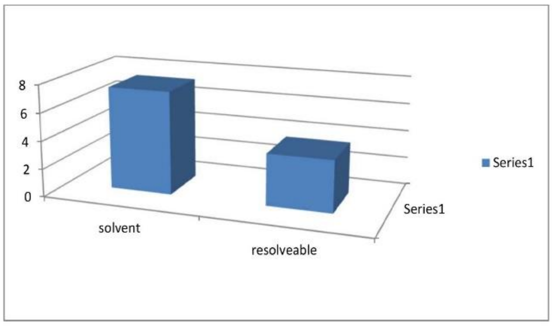
COMPONENTS OF PLA AND CH3CL3

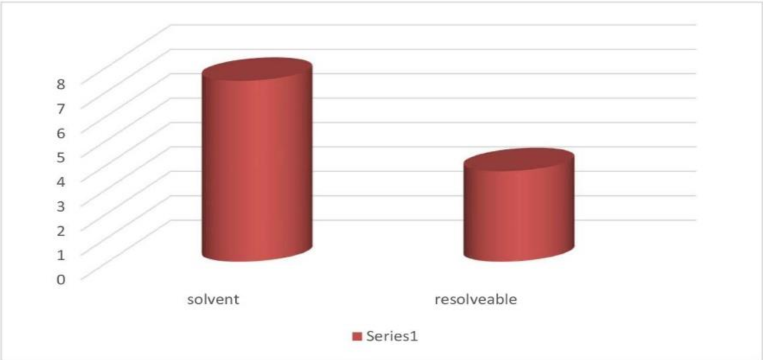


THERMOMETER

FILAMENT ADHESIVE







Graph of Solvent and Solution

RESULT AND DISCUSSION

Adhesive for 3D Printing US20130310507A1

In one aspect, adhesives for use with a 3d printer are described herein. In some embodiments, an adhesive for use with a 3d printer comprises a first polymeric component comprising a poly vinyl alcohol and a second polymeric component. The poly vinyl alcohol in some embodiments, comprises amorphous poly vinyl alcohol. In some embodiments, the second polymeric component comprises a water-soluble polymer.

Further, in some embodiments an adhesive described herein further comprises a solvent a surfactant and or preservative.

 Online ISSN: 2456-883X

Finishing system for 3d printed components WO2016022449A1

Finishing system for a 3d printed object involves applying a film to an outer surface of the object in order to hide surface artifacts with the 3d printing process that created the object.

3d printing powder compositions and methods of use WO2013043908A1

Powder compositions that can be used with traditional 3d printing technology and methods for producing 3d printed building materials that have comparable compressive strength standard concrete and tensile strength up to 70% greater than standard concrete.

Super Glue

CN103146312A

The invention relates to super glue and belongs to the field of chemical engineering. The super glue is characterized by comprising chemical fiber powder, propyl alcohol, ethyl alpha-cyanoacrylate, latex and water. The super glue utilizes water- soluble polymers as raw materials so that glue corrosivity is effectively reduced; hardening is difficultly, a bonding rate is fast, adhesion strength is good and use time is prolonged.

Innovative Feature						
Improved manufacturing quality	Rapid absorption of materials and high adhesion	No damage to the respiratory system	Recycle ability without discarded material	Environmental compatibility	Better Build-in with the Printer	Name and Invention Number
					*	Adhesive for 3d printing us20130310507a1
*						Finishing system for 3d printed components wo2016022449a1
	*					3d printing powder compositions and methods of use wo2013043908a1
	*					Super glue cn103146312a

*	*	*	*	*	*	Filament adhesive

Comparison of Other Patents with Filament Adhesive In Terms of Innovative Features

CONCLUSION

In recently years, due to the increasing workload of individuals in society, social life has led to significant improvement in product yields. The designed adhesive is generally simple and yet highly functional. This adhesive generally has a built-in yet practical, structure that incorporates unique benefits and that clearly illustrate the capabilities of the system. Prevention of environmental pollution, waste from the consumption of gods made of poly lactic acid decomposed and disintegrated in the vicinity of the soil. To prevent greenhouse gas emissions industrial production of poly lactic acid requires the cultivation of plants used as a bulk feedstock. Adaptation to living tissue as raw materials for the production of plant lactic acid in packaging applications, do not transfer to packaging goods, especially food, chemicals and abnormal materials. Reducing the use of petroleum resources in production of poly lactic acid not only is oil not used as a feedstock but its production process but also require less fuel. Using renewable sources, plants can be produced and recycled as raw materials for the production of poly lactic acid. Each of these features alone can be a compelling reason to expand the production and application of poly lactic acid compared to today's plastics.

The advantages of this industrial application include the following:

- ✓ Improved manufacturing quality
- ✓ Better build-in with the printer
- ✓ Environmental compatibility
- ✓ Recycle ability without discarded material
- ✓ No damage to the respiratory system
- ✓ Has a structure that conforms to chemical standards
- ✓ Rapid absorption of materials and high adhesion

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