Continuous liquid interface production (CLIP)

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Abstract - *Additive manufacturing becoming very slow and time taking process for 3D printing, to form new fabrication model in layer-by-layer technique. A new CLIP (Continuous liquid interface production) technology is coming into the light to fabricate models in a simple manner with less time consumption. These are nothing but monolithic designs.*
CLIP is achieved with an oxygen-permeable window below the ultraviolet image projection plane, which creates a "dead zone" where photo polymerization is inhibited between the window and the polymerizing part.

Key Words: 3D printing, Additive manufacturing, Continuous liquid interface production, oxygen-permeable, Ultraviolet, Monolithic, Permeable

1. INTRODUCTION

Additive manufacturing has become an essential technology in wide range of which includes make-your-designs-by-yourself. Fields such as spare parts industries, automobile industries, tissue engineering, materials for energy, chemistry reaction ware, molecular visualization, microfluidics and low-density, high-strength materials.

Currently we have few 3D process for additive manufacturing which are becoming very slow for fabrication models such as s fused deposition modelling, selective laser sintering(SLS), and stereo lithography, this delay is due to layer-by-processing. To construct a model it is consuming several hours for a single fabrication.

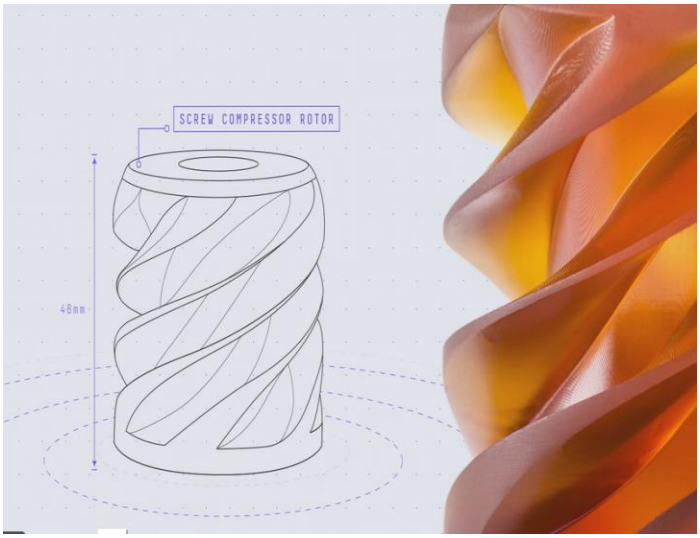
If additive manufacturing to be viable, it should minimize manufacturing hours and increase mass production. Although oxygen inhibition of free radical polymerization is a widely encountered obstacle to photo polymerization (light-activated resin is a polymer that changes its properties when exposed to light, often in the ultraviolet or visible region of the electromagnetic spectrum) UV-curable resins in air, we show how controlled oxygen inhibition can be used to enable simpler and faster stereo lithography.

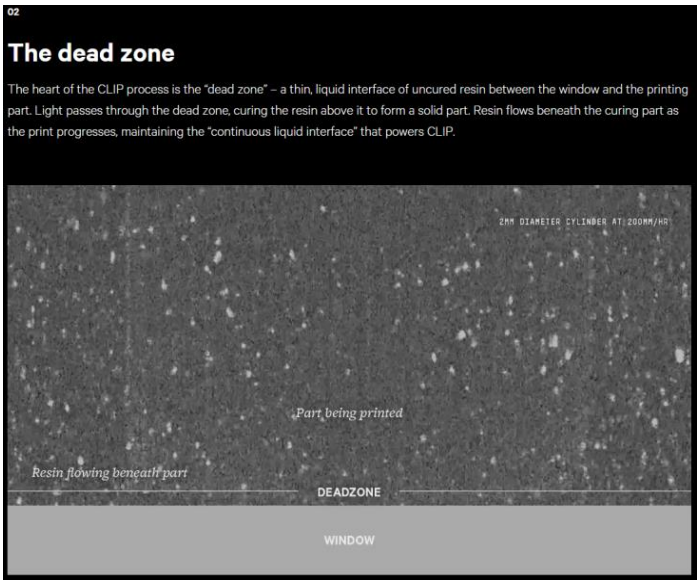
1.1 In detailed process:

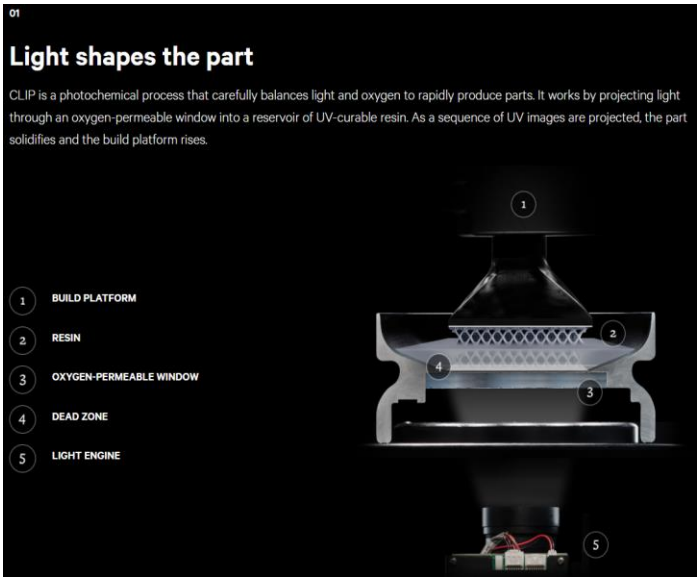
Digital light synthesis combines carbon CLIP technology programmable liquid resin to enable end use parts with exceptional surface finish and unmatched mechanical properties. The below screw compressor rotor is very important in industry and its heart to the company. Only highly equipped machines make these screws. Manufacturing with CNC technology is very typical and expensive and not affordable

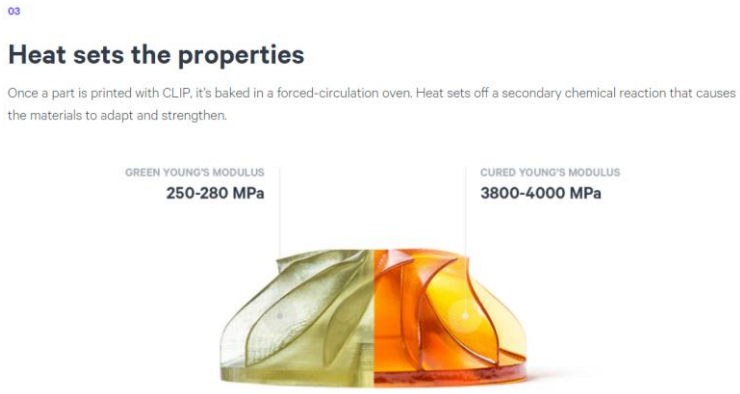
Here is how carbon technology works to print end use parts. Light from custom high performance LED light engine projects the sequence of UV images, exposing the cross section of the part, causing the UV resin in a controlled way. Oxygen passes through the OXYGEN-PERMEABLE-WINDOW creating a thin liquid interface of uncured resin between the window and printing part known as "DEAD ZONE". The dead zone is a third of a human hair thick, however it is areas is responsible for carbon remarkable high performance resolution and unique isotropic parts.

Just above the dead zone, the UV light projected upwards and cascade like partial curing of the part. By passing the light it is not complete process, all the grains should be thermally heated and get stronger bond.







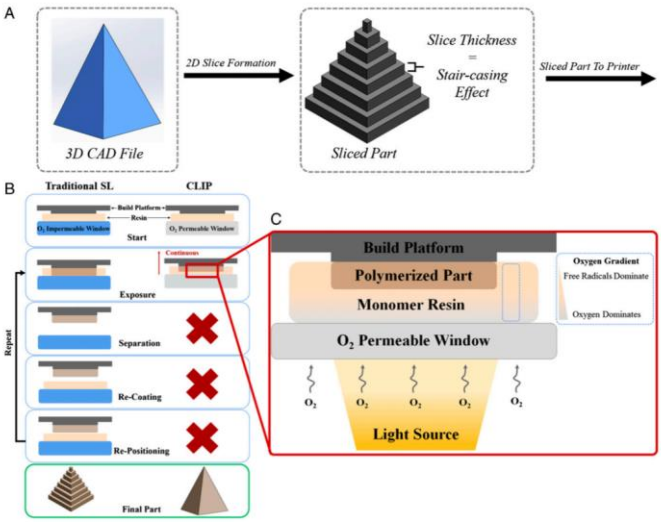


List of CLIP technology tools and the companies which are used by them

1.2 Future directions

Digital and Additive manufacturing technology have gained a huge impact in fabrication fields. Now, it's time to think about 4-D technology methods, 4-D methods are already in the used technology, even they are reaching to washout 3D printing methods

2. STEP BY STEP PROCESS



Materials and Methods

Resin Formulation. Resin reagents obtained through Sigma Aldrich were TMPTA, diphenyl, 2,4,6trimethylbenzoyl phosphine oxide-DPO, and 2-(3′-tertbutyl-2′-hydroxy-5′-methylphenyl)-5-chlorobenzotriazole-BLS1326. The base resin was formulated using TMPTA + 1.0 wt % DPO and then modified by addition of 0.03 wt % UV absorber BLS1326 to tune the cure depth.

3D printing's with CLIP technology

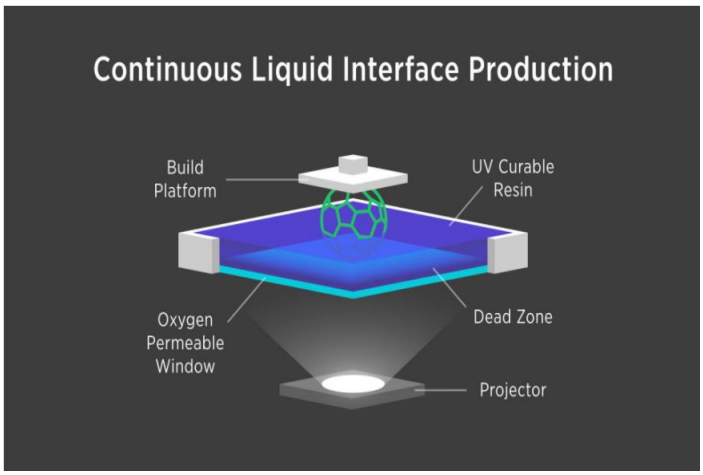
Alexander, Nikita who got first two patents, introduced this CLIP Technology. After the occurrence, many thing got changed to the printing world by giving new features for new designs. This CLIP technology combined engineering properties of thermoplastics with good surface finishing. This technology is widely used in all the industries despite of the properties and standards.

This give good surface finishing with single layered prototype

The Carbon 3D printer after a successful 3D print with the building platform up

CLIP 3D printing technology and its benefits

CLIP stands for Continuous Liquid Interface Production, and it replaced 3D printing technology, which had very good standards in the market, and replaced by traditional mechanical process.



This technology based on the projecting the image on the surface by UV rays by a digital light projector, passing oxygen permeable. Dead zone created below oxygen permeable by passing the exact image to the build platform

3. CONCLUSIONS

CHIP technology has created a new platform for mass production companies by using different materials for fabricating the designs for different usages. We have different carbon materials for use, to reach common requirement for designing small products to larger products.

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