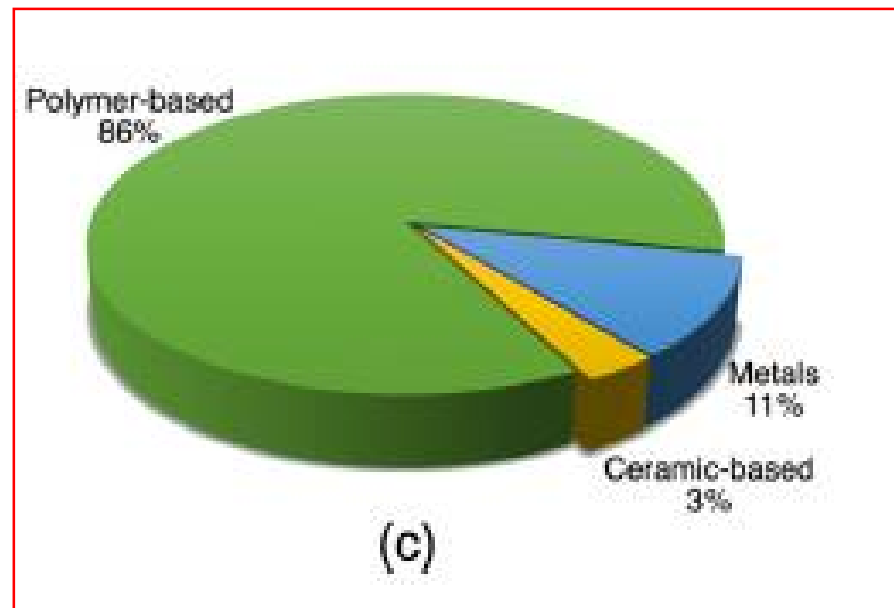




Percentage of different categories of materials used to print medical instruments





POLYMER

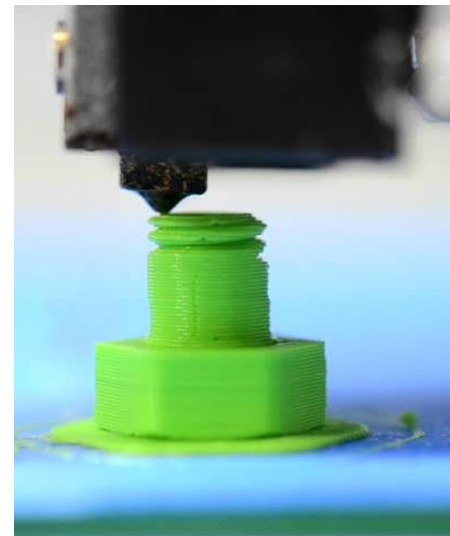
ABS Polymer

- This polymer has an **amorphous structure** and is made of three monomers:
 - Acrylonitrile (C₃H₃N),
 - Butadiene (C₄H₆), and
 - Styrene (C₈H₈).

ABS polymers are used in several applications including **automotive, consumer electronics, and appliances.**



- The polymer has several desirable properties such as its **good strength** and relatively high **toughness**. The properties can be manipulated by adjusting the amount of **each monomer**.
- It is used in stereolithography (STL), fused deposition modeling (FDM) and selective laser sintering (SLS) RP technologies.





Acrylics

- Acrylics are polymers with an **amorphous structure** that are obtained from acrylic acid.
- They are noted for their **good transparency**, which allows them to transmit about **90% of incident light**.
- This makes them good candidates for replacing glass; however, they have **lower scratch resistance** than glass.
- Acrylics are available in many colors and an example is Plexiglas. They are used in **automotive and optical instrument applications**.
- Acrylics are used to produce prototype parts using the **STL technology**.





Nylon

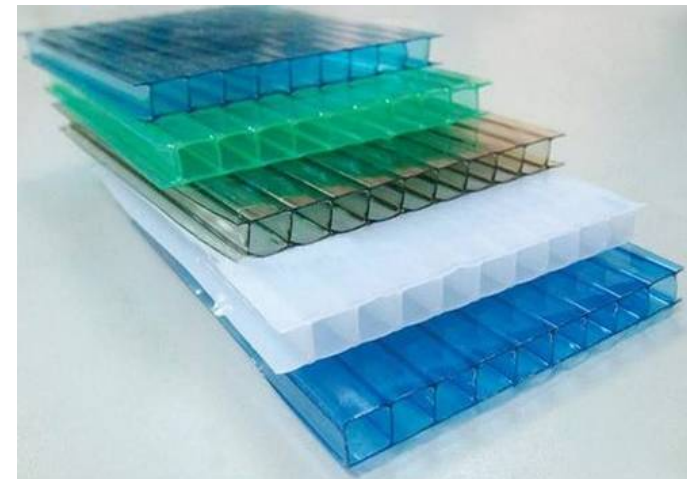
- Nylons are members of the polyamide (PA) family and have mostly **crystalline structures**.
- Nylons have **good wear resistance and their strength** can be improved by reinforcing them with glass fiber.
- Nylons are the main prototyping materials used by the **laser sintering (LS)** technology and are also used by the **FDM technology**.





Polycarbonate

- They have an **amorphous structure** and are characterized by their **good creep resistance and good toughness**. They have excellent resistance to heat compared with other polymers.
- They are used in automotive windshield applications as well as product housings.
- ✓ They are used for **STL prototyping** applications.





Polyethylene (PE)

- Polyethylene has **good toughness and relatively excellent resistance to chemical attack.**
- Polyethylene has two major types:
 - low density polyethylene (LDPE)
 - high density polyethylene (HDPE).
- ✓ Polyethylene is used in **FDM technology.**





Polypropylene (PP)

- It has **good resistance to chemical attack** and has properties that are comparable with HDPE.
- It is used in the **FDM** rapid prototyping technology.

Polyvinylchloride (PVC)

- PVC is used in **SLS rapid prototyping** technology.