POLYTRONICS-EMERGING TECHNOLOGY & ITS APPLICATIONS

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WHAT TO EXPECT IN THIS PRESENTATION?

- An introduction to Polytronics which involves use of conducting polymers as materials of microelectronics.
- Application of Polytronics in inkjet printing technology.
- Application of Polytronics in Rubber circuits& Plastic batteries
- Other applications and the relevance of this emerging technology in the field of Electronics

POLYTRONICS

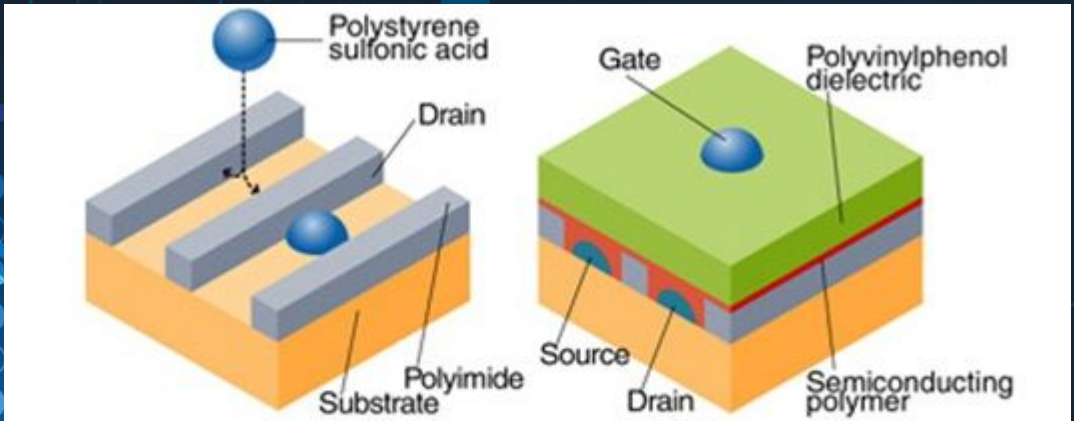
- Involves the usage of electrically conducting polymer or plastics in making electronic circuits .
- The ‘PLASTIC CIRCUITS’ is one alternative that would meet the future technological needs.
- Polytronics have some advantages over the current silicon technology which is mainly used in electronics.

Advantages are :

- Easy Manufacturability (mass production).
- Low cost.
- They can be recycled and reused(decreases environmental stress).
- Consumes less power.
- They are mobile, small, and light in weight.
- They are used to make display devices that have extraordinary picture quality.

INKJET PRINTING TECHNOLOGY

- The huge cost of manufacturing Silicon microchip is due to the large complex processes involved.
- The INKJET PRINTING TECHNOLOGY provides continuous production line of plastic circuits on plastic substrates and then cut into individual units.
- Major role in the development of “flat screen” displays.



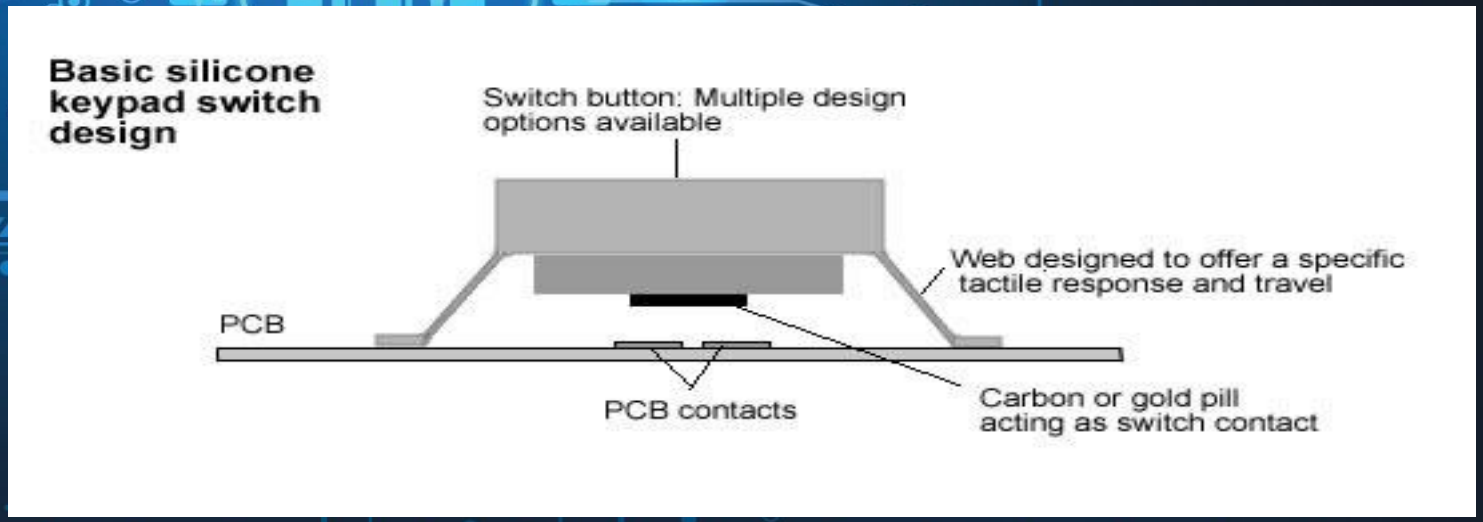
Construction of topgate transistor

- A piezoelectric material expands when a voltage is passed across it, pressing on a reservoir fluid and sending droplets flying out on to the substrates
- The water based droplets contain an organic conductor-POLY (3,4- ethylenedioxythiophene) doped with a solution of polystyrene sulphonic acid otherwise known as PEDOT/PSS.

- As the droplets dry they become a conducting layer and form source and drain of a transistor. They are then coated with a layer of semiconducting polymer (9, 9- dioctyl flourene-co- bithiophene) followed by a dielectric layer of polyvinyl phenol.
- Finally gate is printed, creating a so called top gate transistor. How the semiconductor polymer dries is very crucial.
- Though the molecular chains are lined up for easy electron flow , polymers tend to form into disordered microstructure reducing electron charge.

Rubber circuits boards

- Silicone rubber keypads (*also known as Elastomeric Keypads*) are used extensively in both consumer and industrial electronic products as a low cost and reliable switching solution.



- In order to make an electronic switch a carbon or gold pill is placed on the base of the switch center which contacts onto a PCB when the web has been deformed.

- Common applications of silicone rubber keypads include remote controls for TV, video and HIFI units, electronic toys and games, and industrial control equipment.

- With the increased use of low current switching within automobiles, silicone rubber keypads are being used extensively as switch mechanisms for various function buttons such as window lifts and steering wheel mounted controls.

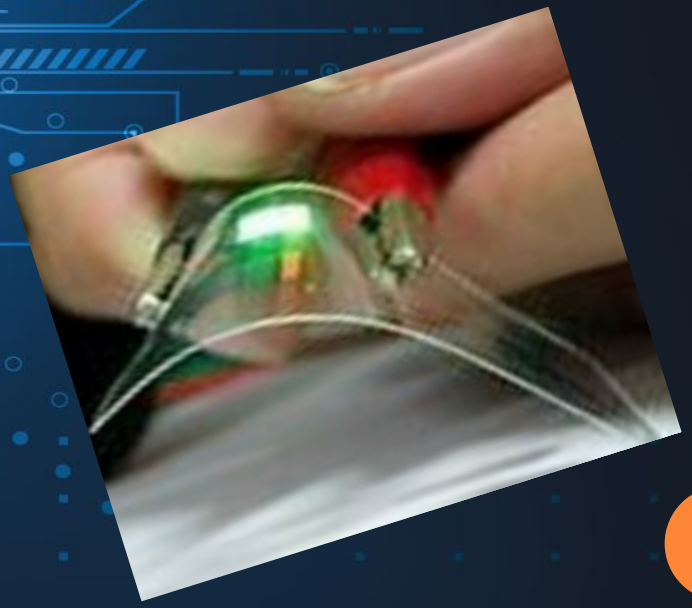
- The technology uses the compression molding properties of silicone rubber to create angled webbing around a switch center. On depression of the switch the webbing uniformly deforms to produce a tactile response.

- When pressure is removed from the switch the webbing returns to its neutral position with positive feedback. In order to make an electronic switch a carbon or gold pill is placed on the base of the switch center which contacts onto a PCB when the web has been deformed.

Plastic batteries

- Plastic batteries are new type of low power batteries that do not require a case and are thin enough to be printed on a paper.
- They are of low cost and can be mass produced as the battery material is roughly 0.5 millimetres thick.
- These batteries are lightweight and can be moulded into any size and shape for use in satellites and important military equipment.

- Polymer batteries can be recharged and reused a number of times without loss of power.
- Besides these don’t contain hazardous chemicals typically found in nickel-cadmium cells and are therefore environmentally safe.



Electronic paper

- Made from a display technology called gyricon technology by XEROX , PARC .
- electrically writable and erasable and can be re-used 1000s of times.
- displays are reflected light like paper. For comfortable , also provides a wider viewing angle than most light-emitting displays.
- Nowadays , electronic ink technology used in e-paper which is used as display backplanes for e – book readers like Kindle , mobile phones , watches etc.

Conclusion

Polytronics is going to change the whole world of consumer electronics and form the principal root for the major advancement in the design of electronic circuits and manufacture of printed circuit boards (PCB).The era of polymer electronics has taken a great start and all the technological companies have turned their entire research towards Polytronics.


Thank you