Materials of the future

Throughout our history, the advancements in material technology have shaped our future and is to this day always evolving. Some materials even have an entire era named after them, such as the bonze age or the iron age. This just goes to show the impact that a newly discovered material can have on the evolution of humankind. It can accelerate and shape our futures. As we speak technological advancements make it possible to create a wide variety of materials. These days, more often than not the emphasis lies on creating more eco-friendly materials that can have a positive impact on the design world and the planet. Here is a list of some of the most interesting materials of the future that are bound to have a big impact on the way products are designed going forward.

Bioplastic

Plastic is a very versatile material but most plastic other than rubber is derived from fossil fuel. Say hello to – Bioplastic. Bioplastic is actually an umbrella term for plastics that are either biobased, biodegradable or have both properties. Bioplastics are produced by using renewable or recycled materials such as corn starch, sawdust, recycled food waste, and vegetable oils.

So, what makes bioplastic a material of the future? Well, as you can imagine, switching products and manufacturing from traditional plastic to bioplastics rather than using fossil fuel derived plastics would be a huge leap in the right direction to the ever-growing plastic waste problem the plant is facing.

Bioplastic is already being used for disposable items such as cups, straws, and cutlery. They are also being used on a commercial scale such as biodegradable shopping bags. However, designing products with bioplastic from the start can have a far-reaching positive impact for the planet.

Chips Board

What is your favourite potato dish? How about a chip board? Turning waste into a usable material is a great way to make our planet more future proof. An environmental loop is created simply by reusing waste rather than precious finite resources mimicking the circular economy that is seen in nature. Rob Nicoll, the CMO and co-founder says: 'materials often need to have short lives so our vision is to create materials that work with the cycles of nature not against them.'

The materials that are produced are free of toxic chemicals and are compatible with 3D printing, injection moulding and other industrial techniques. Lending itself to many different types of design.

Graphene

We have been using graphite for a long time but for many years scientists wondered if a single layer could be isolated. Well, in 2004 Andre Geim and Konstantin Novoselov at Manchester University actually managed to isolate think layers of graphite using a roll of scotch tape that was then processed into graphene. In 2010 they were awarded the Nobel Prize in Physics. Graphene is being hailed as one of the new super-materials.

Graphene is not only highly flexible and transparent but has powerful electrical properties. It's also impermeable to almost all gasses and liquids due to its tight atomic bonds however, water molecules being an exception to that rule. This makes graphene the perfect material to use for all kind of water purification systems, such as drinkable

salt water or even filtering radioactive waste. It also has a high current density, far higher than copper for example. Graphene doesn't have a band gap which in turn is ideal for use in solar cells.

Graphene's elasticity is another property that help the material keep its status as a super-material of the future. It can stretch to around 20% but it's still 200 times stronger than steel. Needless to say, the list of Graphene applications is extraordinarily long. From computing chips, bendable batteries, wearable technology, to medical innovations the uses seem limitless.

Artificial spider silk

Artificial spider silk was developed by researchers at Cambridge University. Spider silk is a very impressive material. It's said to be one of the sturdiest materials that is found in nature, it's stronger than steel and can stretch several times its length before it actually breaks. Artificial spider silk was designed to mimic these properties. The artificial spider silk that was developed by researchers Cambridge University is made out of 98% water.

Another research team at Washington University have also used spider silk as a reference point and have more recently developed a new iteration of the fibre using genetically engineered bacteria in order to produce amyloid silk hybrid proteins and then adding nanocrystals to the fibre as found in spider silk.

Artificial spider silk is completely biodegradable and could be used as protective fabric thanks to its energy absorbing properties. It could be used for parachutes, airplane wings, bulletproof jackets and bike helmets to mention just a few uses for this material that is inspired by nature.

Mushroom insulation

Whoever thought the humble mushroom could be turned into insulating material? The vegetative part of the mushroom – mycelium is left to feed on a substrate like sawdust. It can grow to any possible shape you want it to. At the final stage when it's finished growing the material is left to dry out. Afterwards it can be sanded and painted so it can be used for it's planned purpose.

This material has some great things going for it, as it's made out of natural materials it is biodegradable. The actual cost of the raw materials is also quite inexpensive lending itself to being a front runner and valid competitor when manufacturing or shall we say growing is scaled up. The material is also said to help purify the air and remove carbon, which in turn actually strengthens the material at the same time. The mushroom insulation is also self-extinguishing and therefore is perfectly suited for use in any kind of construction from small scale to large-scale building projects.

AuREUS

This new type of solar panel is actually made from food waste. The cladding is made from specific types of waste crop. These fruits and vegetables have particles within them that can actually generate clean energy from ultraviolet light. By crushing these specific vegetables and fruits bioluminescent particles are extracted and then suspended in resin which can then be used as cladding on windows and walls. 'The light relies on internal reflectance of the material' says Carvey Maigue, the man behind the material. This captured light can be converted into electricity by photovoltaic cells, that are being used for traditional solar panels. These are attached to the outside of the resin cladding.

Using the eco design principles of AuREUS material gives us a new form of renewable energy. That let's us harness the suns energy in a new way. In the future this material can find its use not only as solar panels but could also be made into fabrics and plates that could benefit the Automotive and Aviation industry.

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