

Sustainability and Material Innovation

MaterialDriven

Materials have been around since the beginning of time. In fact, we have classified historic time periods by material type as humankind engaged and mastered each new discovery—the bronze age, the iron age, the steel age and so on. Materials shape the way we interact with our environment and reflect the evolution of our identities and our societies.

But it is now more than ever that their relevance is understood. Facing undeniable and urgent issues such as diminishing resources, growing landfills, carbon-heavy air, and water polluted with plastic, materials and the makers behind them, stand to be key players in our race to save our planet.

A material innovator works across disciplines—encompassing design, science, technology and culture—to create strategic products for specific problems, unrestricted by norms that established industry entities are bound by.

Over the past years we have seen a noticeable change in consumers' awareness of the impact that materials have on our environment and the role they play with regard to our health and wellbeing. A more sophisticated knowledge of materials means that consumers are far more literate and interested in material innovation than ever before. At MaterialDriven, we have seen a rise in enquiries across all industries—architectural studios, packaging designers, fashion brands, property developers and even directly from consumers who want support in choosing better materials.

So what are companies asking for in terms of sustainability?

No Guilt- Brands and companies want to help consumers feel they are having less of a negative impact on the planet. In order to achieve this they are relying on material suppliers to support them as well by:

- Sustainable packing- Removing plastic packing is becoming a demand from most retailers, weather its with alternatives such as bioplastics that are biodegradable, or natural materials such as heat pressed leaves, or by completely removing the need of packaging.
- Recovery Systems- Material producers or suppliers are now expected to offer extended responsibility over their products throughout their

full life cycles, including reclaiming and reusing them at the end of their operational life.

- Clean Materials- Phase out “red listed” chemicals from products such as those in flame retardants or antimicrobials.
- Disclosure -Architects, designers and builders are now demanding absolute transparency regarding what goes in every product or material, supported by labels and third party certificates such as Cradle to Cradle, Declare or the Health Product Declaration (HPD)

Compelling Narratives- Sustainability is bringing on a change in aesthetics that consumers need to understand and accept. Grown materials from mycelium, or algae-based cladding might not initially fit the consumer’s idea of glamour or luxury. But by engaging the client with an understanding of the origin of the material, by explaining what problem it solves and by connecting them to the exciting story that unlocked this new material, the new aesthetic becomes innovative, cutting edge and appealing.

Responsible “disposable” materials – Retailers, Exhibition and Set designers need to keep their works and projects vibrant, fresh and innovative. This means that they require disposable materials that can serve temporary needs and still look good, are not expensive AND are not harmful to the environment. These materials must have shorter life cycles, be easy to dismantle and dispose—either recycle or biodegrade—all while being robust and aesthetically pleasing. Example Chip[s] Board made with 100% potato waste, aims to substitute MDF.

As we have established, consumers are now hyper aware of materials- which ones are good and which ones are bad- and are becoming highly selective and knowledgeable about what should and shouldn’t be used in their clothes and environments.

Here are some of the trends that are present across the material landscape in response to these demands:

Healthy materials—There is an increased interest in materials that support our wellbeing, that are free from toxins, that purify the air, or soothe the senses, while causing no damage to the environment during their manufacture or lifetime. These can range from graphene-based paints to wall coverings made with leaves, or seeds and bio-binders, to seaweed-based fabrics that neutralise toxins in the air.

Waste-based materials continue to be a strong trend, with waste from multiple sources (the more challenging the better – human hair, urine, blood!) being transformed into new surface materials, and lighting. Plastic packaging of course is one of the biggest sources of waste, followed closely by coffee grounds and organic waste such as sea grass, wool or potato peels

Social Responsibility- Companies are understanding the importance they play in making a change in the way we have been consuming products and goods until now. The linear manufacturing model (make-use-discard) is no longer acceptable and they must play an active role in encouraging and educating consumers in circularity- that is, offering recycling programs, or repair kits and workshops for example. Ethically sourcing and discarding their materials is also becoming a matter of pride from brands and retailers.

Biomaterials—materials that are natural, grown, bio-fabricated even, or biophilic in nature—are becoming more and more valuable, especially when it comes to the consumer need for biodegradability at the end of a product’s life. For example compostable materials made from agricultural waste and mushroom mycelium (branched, tubular filaments of fungus). We mentioned Ty Syml before and there are others such as Ecovative or Mogu.

Natural vegan alternatives to leather- Veganism is a lifestyle choice that is unstoppable and clearly here to stay, and it was only a matter of time that this conditioned the design industry as well. Leathers of course are a pain point for companies that want to apply this material to their work. However an incredible range of alternatives is in the market now, biobased and biodegradable, but just as durable and beautiful. For example BeLeaf, made with leaves from the Brazilian Amazon, In addition to being a renewable resource and having zero impact on the environment, beLEAF™ also eliminates the carbon footprint of its production.

Bioplastics- Bioplastics are plastic-like materials produced from renewable biomass sources, such as vegetable fats and oils, corn starch, straw, woodchips, sawdust, recycled food waste. In our quest to remove all petroleum based plastic from our planet, material suppliers across industries (packaging, fast moving consumer goods, fashion) are coming up with a whole range of plastics that are biodegradable and industrially compostable. Crafting Plastics is a company that is taking a step further by developed the second generation of their material Nuatan® to be home compostable in under 3 weeks. Compare that to current man made plastic that on average takes up to 1000 years to disappear!

When we talk about material innovation within the realm of sustainability, many of the products can still seem far fetched and far from being ready for commercial settings. However a huge impact can be made on human health and on the environment with even the smallest of changes.

Avoiding Adhesives and Sealants wherever possible -Not only are adhesives commonly high in toxic chemicals, but using mechanical joinery makes it easier to disassemble materials at the end of their usage, allowing them to be reused or recycled. For example the company Niaga ® has developed a reversible adhesive the can “de-click” so that materials can de separate and reused easily

Detoxification - by reducing the use of toxic substances throughout a product’s life cycle, through development and use of safer chemical and design substitutes. This means avoiding all ‘Red List’ chemicals in interior products, such as flame retardants, antimicrobials, Phthalates, Bishphenols, Solvents, highly fluorinated stain treatments, VOCc including Formaldehyde, PVC or Vinyl.

Transparency- Third-party life-cycle assessments and ingredient certification tools can be and should be provided by manufacturers, contractors, and designers with metrics to evaluate manufacturing process and products. Retailers can request data about energy, carbon, sourcing, and ingredients. Once the information is available, manufacturers should be “pushed” to look into and use more naturally derived ingredients that have the same performance and durability as existing products is essential. The more demand the more changes there will be.

Dematerialization – the aim is to reduce the amount of materials used or discarded in a product or process. Strategies for dematerialization include recycling or reusing waste, using less material, increasing product life, selecting materials that can be recycled or composted, and designing for repair, reuse, upgrade, and adaptation.

These steps might seem small, but as brands and retailers get on board they are slowing building up the basis that will evolve into the material trends for future:

Regenerative design – A new way of thinking about materials and the role they play in our environment. Far from trying to be sustainable or “neutral” the aim is to target a “Net Positive Energy” objective. For

example, carbon eating materials such as Made of Air or theBreath by Anemotech that are actively removing pollution from the air, or Ty Syml's Mycelium tiles that add nutrients to the earth when discarded and disposed of.

Green chemistry- "an approach to chemical and process design that reduces or eliminates the need for and generation of hazardous substances through the application of 12 design principles. The philosophy behind green chemistry is that if chemicals and chemical processes are designed in an inherently safer and benign manner, there will be less need for controls to mitigate exposure, ultimately reducing risk over the life cycle of a given material. Employing green chemistry requires educating chemists and incorporating safer chemicals and processes into the earliest stages of product design to minimize the potential impacts of chemicals while optimizing the chemical structure to give the desired properties. "

-Healthy Materials Lab

Circularity- By Intercepting and reusing low value organic waste from both from the countryside and our cities we are creating an two pronged solution to the current issues of waste management, that are a costly problem in both economic and environmental terms, and dwindling resources. Organic waste traditionally ends up in landfill, incinerated or composted. This could be diverted – at least in part – to become a resource for the creation of construction, engineering, design and architectural products before being fed back in the biological cycle at the end of their lifecycle. Bioplastics are being made with this waste, and when discarded they close the loop by feeding nutrients back in the ground.

Carbon Neutrality- Brands and retailers will be valued and measured by their Carbon Impact, where the carbon emissions caused by them will have to be balanced out by funding an equivalent amount of carbon savings elsewhere in the world. Platforms such as Carbon Footprint can support companies in achieving their goals.

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