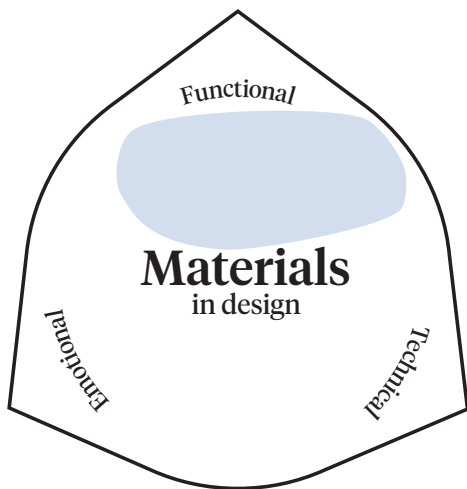


Material Responsivity



Material Responsivity

What?

Material responsivity is materials' capability to change one or more properties when impacted by a defined stimulus. Stimulus can e.g. be heat, electricity, chemicals, moisture, UV-light, pressure. The response manifests changes in a material's molecular structure due to higher or lower energy levels of the material.

Why?

It is possible to program responsive materials to shift modus under specific conditions. It can thus lead to less material use by e.g. promoting multi-functionality. Furthermore, responsive materials support complex operations in products that are difficult to mechanically construct.

Challenges

- Materials might be expensive or require high levels of technological understanding.
- Materials might not be environmentally friendly due to e.g. material origin, technologies or chemicals used in production and material 'hybrids' might compromise recyclability.
- Sometimes responsive materials have more of a 'gimmicky' effect in products.

Examples

- MIT's Self-Assembly Lab has developed an auxetic material that can automatically respond to changes in temperature by expanding at high temperature and contracting at low temperature.
- Marjan Kooroshnia has explored the design properties and potentials of colour-changing effects with leuco dye-based thermochromic inks when printed on textiles.

This Card Links To

Material Biomimicry / Material Perception / Material Sensing / Material Speculation

Further Reading

Tibbitts (2017). *Active Matter*. MIT Press / Tiwari & Kobayashi (eds). (2014). *Responsive materials and methods: state-of-the-art stimuli-responsive materials and their applications*. Scrivener Publishing.