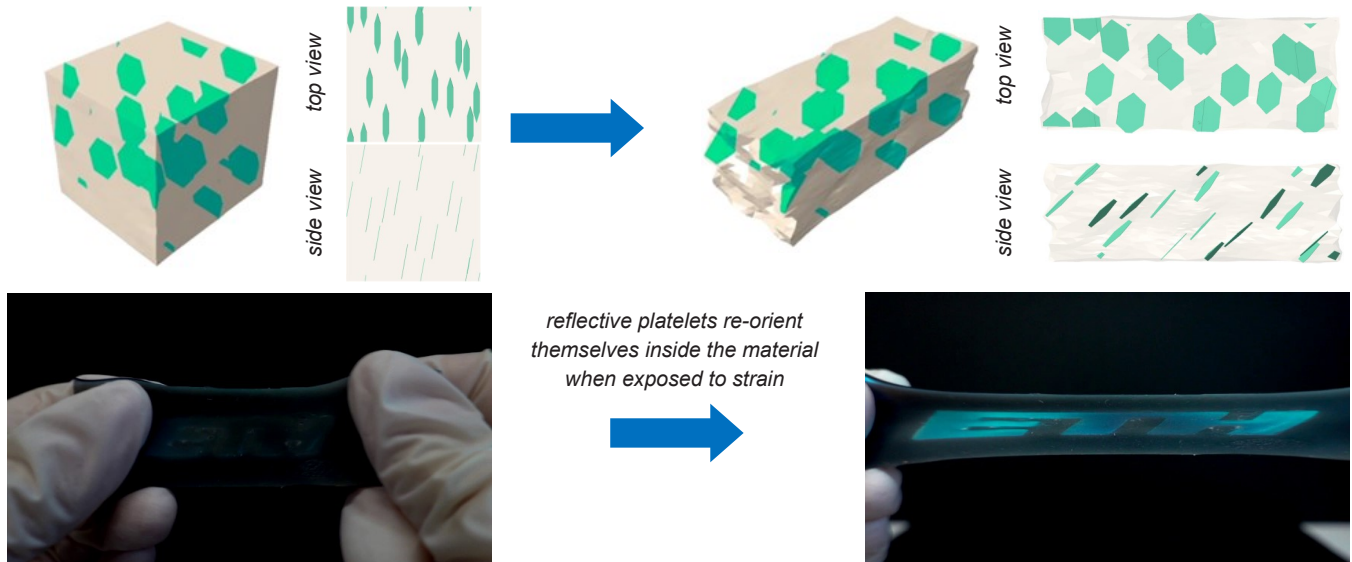


Licensing Opportunity

Colour changing elastomer for the visual detection of deformations or damage



Application

Soft, colour changing materials are of particular interest as deformations of the material translate to visual messages on soft displays, highlight touch points in tactile sensors or serve as sleeves for robot joints to indicate the motion or report damage. The reversible, mechano-optic coupling inside the soft composite requires no electrical power source and is therefore ideal for low or zero power applications.

Features & Benefits

- fast, fully reversible, striking colour shifts
- zero power consumption (purely driven by deformation)
- production easily scalable to industrial volumes

Publications

- “Stretchable soft composites with strain-induced architecture color”, *Advanced Materials* 34 (6), 2104874, 2021, <https://doi.org/10.1002/adma.202104874>
- Patent pending

Background

Colour changes are easily identified by human observers and naturally draw the observer’s attention. Colour changes that are triggered by deformation of shape, thus, help monitoring mechanical properties, such as bending, stretching or undulating. The challenge lies in the bulk production of suitable soft materials, which exhibit fast and fully reversible colour changes. Also, low power consuming solutions are preferable for the integration into smart and/or autonomous devices with limited power sources.

Invention

The colour of the elastomer-based composites depends on the local orientation and architecture of reflective platelets embedded in a polymer matrix. Colour changes arise from the re-orientation of platelets driven by an externally applied mechanical force. The platelets are chosen in shape, size, coating and concentration for optimizing the performance of the soft composite material. Various procedures are proposed for introducing spatially distributed patterns of the platelets so as to make different optical phenomena appear when strained.

ETH transfer

transfer@sl.ethz.ch
www.ethz.ch/transfer
Reference 2021-015



Invented by D-MATL: E. Poloni, A. Rafsanjani, V. Place, D. Ferretti, A. Studart

Technology Readiness Level



YouTube video for demonstration
<https://youtu.be/C9GXbJoUNAI>

