Cephalopod-Inspired Adaptive Infrared Camouflage Materials and Systems

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INVENTORS

» Gorodetsky, Alon A.

OTHER INFORMATION

CATEGORIZED AS

» **Biotechnology**
» Industrial/ Energy
» **Energy**
» Storage/Battery
» **Materials & Chemicals**
» Electronics Packaging
» Polymers
» Textiles
» **Security and Defense**
» Other

BRIEF DESCRIPTION

This technology is a new class of materials capable of thermal regulation and active camouflage. These cephalopod-inspired materials, configurable to different geometries, can be used in many sectors, ranging from consumer to industrial to military applications.

RELATED CASES

2018-242-0

SUGGESTED USES

• Textiles: provide thermal comfort and/or camouflage properties if desired

• Infrastructure: utilize in windows and other parts of buildings

• Security & Defense: incorporate into camouflage platforms

• Electronics: electronic shielding or packaging material

FEATURES/BENEFITS

·Tunable: Material modulates both broadband and narrowband

·Dielectric: Material is both an actuator and energy harvester

·Actuation: Accommodates both mechanical and electrical actuation

strategies
·Adaptive: Camouflaging capabilities are active rather than static

·Flexible: Material is soft and stretchable and can accommodate varying geometries

·Autonomous: Operable without manual control

TECHNOLOGY DESCRIPTION

Thermal modulation is necessary for both insulation and temperature regulation. Materials capable of thermal regulation are useful in clothing, buildings, and other settings. Meanwhile, active camouflage materials, which are capable of readily adapting to their environments, also utilize the concept of thermal regulation by modulating infrared radiation. However, most of these materials are limited in their adaptability and their tunable spectral range. This technology introduces a new class of materials capable of both thermal regulation and active camouflage.

This material is novel because it can modulate its infrared properties both over the entire infrared spectrum and within a specific infrared wavelength range. Furthermore, the material can be actuated either mechanically or electrically. Devices made from the material can also operate autonomously. Finally, the flexibility and stretchability of this material mean that it can adopt different geometries and configurations for various industrial applications.

STATE OF DEVELOPMENT

The material has been developed and tested on the laboratory scale. The key properties of this material, such as spectral range, response time, and cyclability, have been characterized. Future plans include commercial scale-up.

RELATED MATERIALS

» Xu, C.; Stiubianu, G. T.; Gorodetsky, A. A. Adaptive Infrared-Reflecting Systems Inspired by Cephalopods. Science 2018, 359 (6383), 1495–1500 - 03/30/2018

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20210063612	03/04/2021	2018-242

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Material For Thermal Regulation
- A sustainable and scalable bioinspired material with tunable heat-managing properties

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