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Bio-mimicry of photonic multi-scaled architectures of butterfly wing

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In view of the rising interest in biomimicry within the Scientific & Engineering global communities, approaching nature, the STI community is inspired to copy from the numerous creatures which exhibit peculiar multifunctionalities & adaptation in achieving versatile performances. Natural nanostructures such as those on butterfly wings have the general characteristic of being multifunctional and energy-chemical elements. In view of the established effective thermal management of the butterfly capabilities as demonstrated in several publications, the inner ring of the ocellus on the Caligo Memnon was examined. In the quest to unravel the usefulness of the black part, the authors carefully examined the nanostructures of the scales with various techniques. The analysis of the nanostructures give an indication of the factors associated with light absorption in the black part of the ocellus. Further examinations under optical studies point to the presence of pigment contributing to the blackness on the ocellus.

Indeed, biomimicking such nanostructures are useful in the design of oval cost-effective materials for use in applications where weight & cost are limiting factors.

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