

“Nature’s Photonic Crystals”

Color is classically produced when wavelengths of light are absorbed by matter (e.g. pigments) but color can also be produced by diffraction of light by the internal structure of a material. Photonic crystals are nanostructures which affect the motion of light travelling through the structure –resulting in constructive interference patterns and an iridescent effect.

Natural Photonic Crystals include:

Opals

Morpho butterflies - *Morpho rhetenor*

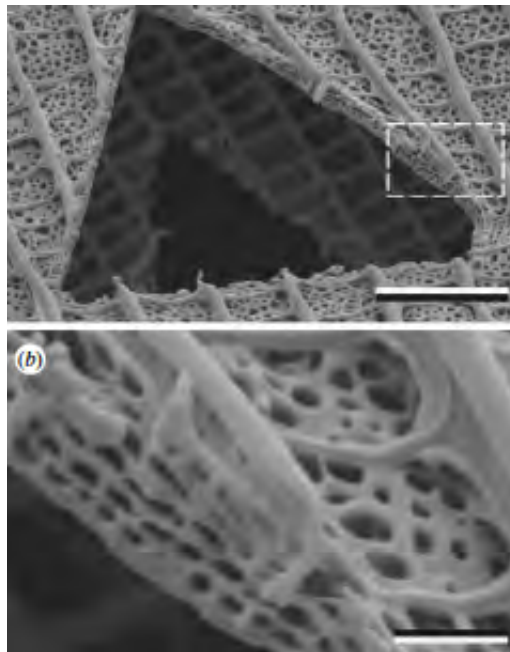
Jeweled beetles – *Chrysina resplendens*

Peacock feathers – *Pavo cristatus*

Others: Fireflies, oil slicks, oyster shells, soap bubbles

Discussion

What are evolutionary advantages to photonic crystals?



SEM image of a triangular hole cut in a wing scale of a butterfly

Next page images printed with permission of Ely Silk of views from science.com

http://www.viewsfromscience.com/documents/webpages/natural_photonics_p1.html