Fabrication of iridescent inorganic replicas using butterfly wings as templates

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Nano-structured iridescent Inorganic replicas have been produced by templating wings of the butterfly. The inorganic replicas we obtained exhibit iridescence, which was clearly observed under reflected optical microscope (OM). Field emission scanning electron microscope (FESEM) analysis shows that all the microstructure details are maintained faithfully in the inorganic replica. A computer model was established to simulate the diffraction spectral results, which were agreed well with the OM images.

The biomorphic 3D porous structures maintained the microstructural features of the original butterfly wing scales' and membranes' morphology down to the sub-micrometer level. Also, for some of the beautiful iridescent butterfly wings are photonic crystal materials, the method presented here could be used for potential applications in photonic crystals. The successfully synthesized iridescent inorganic scales replica we obtained gives us technology [1] and theory supports and confidence to believe to achieve this aim.

[1] W. Zhang *et al., Nanotechnology*, **17**, 3, 840-844 (2006); W. Zhang *et al., Microporous and Mesoporous Materials*, 92, 1-3, 227-233 (2006)