

Estimation of scattering parameters in Pierid and Graphium Sarapedon butterfly wing scales

Priyanka, Sudhir K. Saini, and Rajesh V. Nair

Laboratory for Nano-scale Optics and Meta-materials (LaNOM)

Department of Physics Indian Institute of Technology Ropar, Punjab, 140001, India

*Presently at Department of Physics Bar-Ilan University, Ramat-Gan, 5290002, Israel

Abstract:

Diffuse light transport has been studied in Pierid and Graphium Sarapedon (GS) butterfly wing. The value of transport- mean free path has been estimated by the fitting of coherent backscattering cone using finite media isotropic theory. The low value of transport mean free path in Pierid wing has $6.2\mu\text{m}$ due to high scattering while GS blue/green patches have $4.7\mu\text{m}$ because of the absorption. The present study of the butterfly wing might be helpful to enhance scattering strength, by mimicking these bio-photonic nanostructures with high refractive index white material.