

Abstract Submitted
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Patterns on the iridescent beetle, *Chrysina gloriosa* JUNG OK PARK, School of Polymer, Textile and Fiber Engineering, Georgia Institute of Technology, VIVEK SHARMA, Department of Mechanical Engineering, Massachusetts Institute of Technology, MATIJA CRNE, School of Chemistry and Biochemistry, Georgia Institute of Technology, MOHAN SRINIVASARAO, School of Polymer, Textile and Fiber Engineering, Georgia Institute of Technology — The brilliant metallic color of a beetle *Chrysina gloriosa* has been known to occur due to selective reflectance from a cholesteric structure on the exoskeleton. The surface also appears to have hexagonally packed structures. Crystallographic concepts and Voronoi analysis were used to determine the degree of order in different regions of the beetle. Along the hexagons in the Voronoi diagram, many clustered pentagons and heptagons were observed. Due to the surface curvature, the number of pentagons was found to be higher than the number of heptagons. The cells appear yellow in the center surrounded by a green region with a yellow edge. Confocal microscopy was used to image the underlying structure, which was found to consist of concentric arcs on a surface of a shallow cone. The observed structures resemble the defects on a cholesteric phase with a free surface, and provide an interesting explanation of structural color development in beetles, along with inspiration for the design of chiral photonic structures.

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