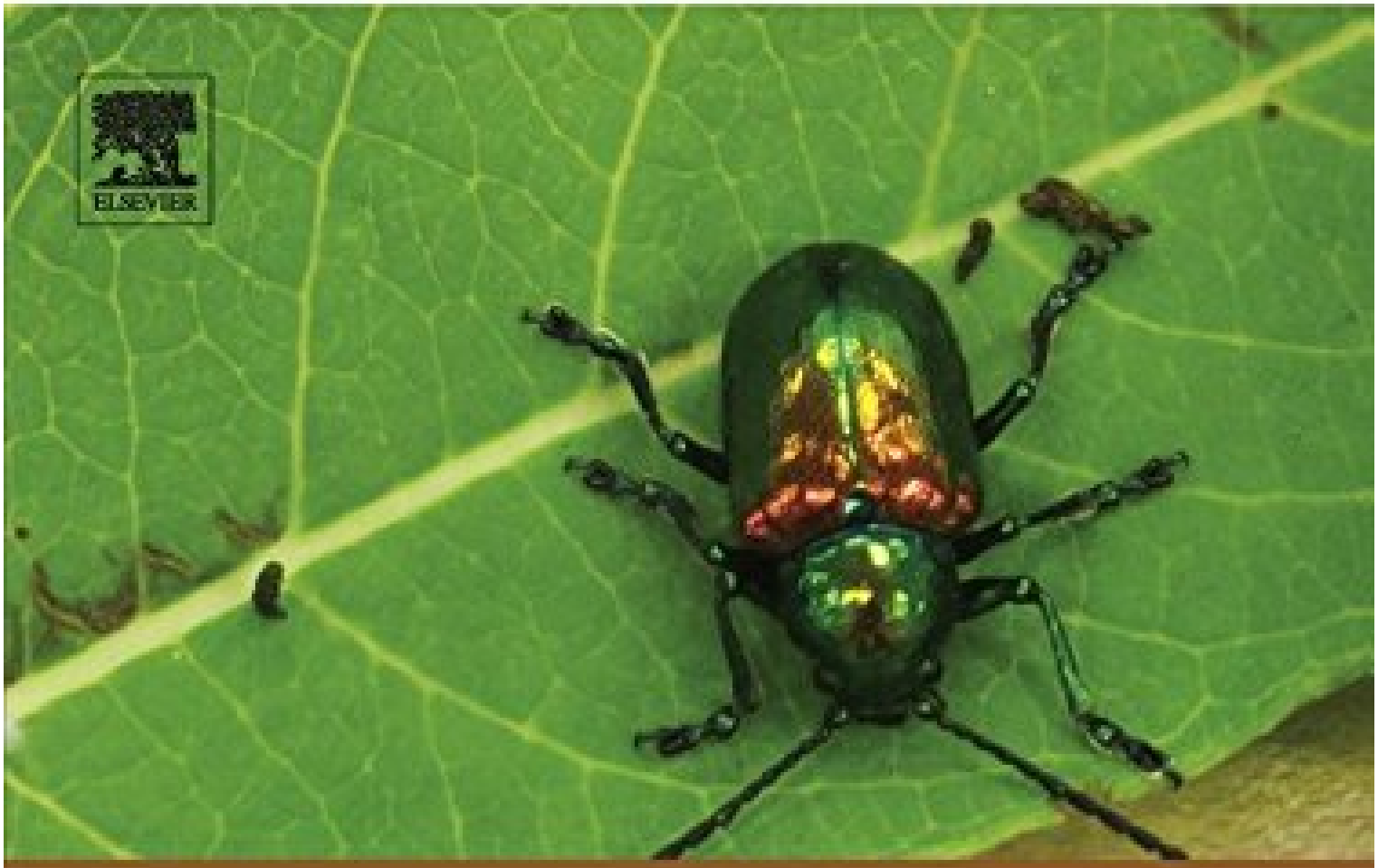
Chapter 14. Solution-Based Techniques for Biomimetics and Bioreplication



Engineered Biomimicry

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Nature generates structurally complex architectures with feature sizes covering several size scales under rather simple environmental circumstances and with limited resources. In particular, solution-based methods provide basic, inexpensive routes to generating bioreplicated structures. In this chapter, we study solution-based bioreplication methods and provide an example for producing three-dimensional photonic crystal structures based on coloured weevil scales. By unraveling the wonders of nature's design, scientists are suffering from biomimetic and biotemplated components with entirely new functions and behaviors. Today, researchers understand how a number of these structures look and behave, but, in many instances, we still lack nature's ability to marry elegant structures with complex efficiency. This example illustrates how structural engineering in biology could be replicated using sol–gel chemistry and results within an entirely new optical materials with fascinating properties.

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