



## Biological Materials of Marine Origin [ Vertebrates /

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Materials science Biochemistry Vertebrates Marine sciences  
 Freshwater Structural materials Biomaterials Materials Science  
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Monografía

This work is a source of modern knowledge on biomineralization, biomimetics and materials science with respect to marine vertebrates. For the first time in scientific literature the author gives the most coherent analysis of the nature, origin and evolution of biocomposites and biopolymers isolated from and observed in the broad variety of marine vertebrate organisms (fish, reptilian, birds and mammals) and within their hierarchically organized structural formations. The basic format is that of a major review article, with liberal use of references to original literature. There is a wealth of new and newly synthesized information, including dozens of previously unpublished images of unique marine creatures including extinct, extant and living taxa and their mineralized and un-mineralized structures from nano- to micro {u2013} and macroscale. The material is organized effectively along both biological (phyla) and functional lines. Several modern topics e.g. g2sBiohaliteg3s, or g2sFish Skin: From Clothing to Tissue Engineeringg3s, as well as g2sSilica-based Minerals in Marine Vertebratesg3s, are never represented and discussed in previously published books. For the first time such current concepts as hierarchical organization of biocomposites and skeletal structures, structural bioscaffolds, biomimetism and bioinspiration as tools for the design of innovative materials are critically analyzed from both biological and materials science point of view using numerous unique examples of marine vertebrate origin. This monograph reviews the most relevant advances in the marine biological materials research field, pointing out several approaches being introduced and explored by distinct modern laboratories. The objective of the book is for the scientists as well as for the senior or graduate standing in engineering or science to gain a solid appreciation for the special significance of the word marine biological materials as well as the rapid and exciting evolution and expansion of biomaterials science and its applications in modern technology and medicine

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**Contenido:** Introduction -- Species Richness and Diversity of Marine Vertebrates -- Part I: Biomaterials of Vertebrates Origin. An Overview -- Conclusion -- References -- Part II: Biomineralization in Marine Vertebrates -- 2. Cartilage of marine vertebrates -- 3. Biocomposites and Mineralized Tissues -- Part III: Marine Fishes as Source of Unique Biocomposites -- 4. Fish Scales as Mineral-based Composites -- 5. Materials Design Principles of Fish Scales and Armor -- 6. Fish Skin: From Clothing to Tissue Engineering -- 7. Fish Fins and Rays as Inspiration for Materials Engineering and Robotics -- Part IV: Marine Biopolymers of Vertebrate Origin -- 8. Marine Collagens -- 9. Marine Gelatins -- 10. Marine Elastin -- 11. Marine Keratins -- 12. Egg-capsule Proteins of Selachians -- 13. Marine Structural Proteins in Biomedicine and Tissue Engineering -- Epilogue -- References

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