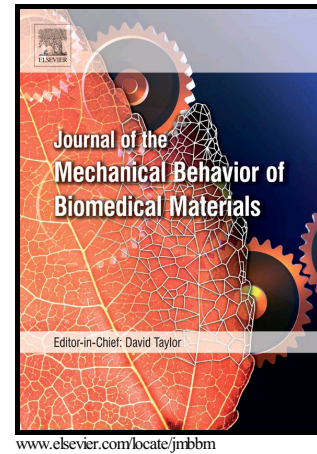


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Understanding hydration effects on mechanical and impacting properties of turtle shell

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Abstract

Study of the properties of natural biomaterials provides a reliable experimental basis for the design of biomimetic materials. The mechanical properties and impact wear behaviors of turtle shell with different soaking time were investigated on a micro-amplitude impact wear tester. The damage behavior of turtle shells with different soaking time and impact cycles were systematically analyzed, also the impact dynamics behavior was inspected during the impact wear progress. The results showed that the energy absorption and impact contact force were significantly different with varied soaking time. Under different impact cycles, the peak contact force of shell samples with same soaking time were approximate to each other in value and the values of impact contact time change in a small range. However, the damage extent of shells were distinct with varied impact cycles. It was found that impact worn scars of shells increase with impact cycles increasing. However, under the same impact cycles, energy absorption and contact time increased with the extending of soaking time, but the peak contact force decrease. Especially shell without soaking, the absorption rate is the lowest.

Keywords: Turtle shell, Hydration effect, Mechanical property, Impact wear, Energy absorption.

1. Introduction

Biomaterials, especially natural materials, have attracted much attention in recent years

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