仿生光滑表面显微结构计算机仿真与设计 Computer Simulation and Design on Bionic Slippery Microstructure Surfaces

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摘 要： 为了设计与制造具有超滑功能的昆虫捕集滑板，基于OpenGL图形平台实现仿生光滑表面显微结构的仿真。利用扫描电子显微镜S-3400N采集猪笼草叶笼超滑表面的蜡质显微结构图像，对提取的图像进行数值分析，建立Visual C++6.0编译环境下的OpenGL图形开发框架，实现了不同状态参数下蜡质晶体的可视化计算机仿真。仿真结果显示该仿真晶片的长度为(1.00±0.20)μm，厚度为(0.10±0.02)μm，高度为(1.00±0.70)μm。通过与猪笼草表面显微结构试验数据的比较，得出该仿真具有较高的精确度和良好的可操作性。 In order to design and manufacture the bionic skateboard with the super slippery function for catching insects, simulation on bionic slippery microstructure surfaces based on OpenGL was presented and performed. The wax microstructure of Nepenthes' pitcher superfaces was examined in scanning electronic microscopy S-3400N, and the images were collected for digital image processing and analyzing. Under the Visual C++6.0 compile environment, the graphics development framework of the OpenGL was established to realize the visualized simulation system of wax crystal layer, for different status parameters. The simulation results show that simulation crystal plates' length, thickness and height were (1.00±0.20)μm, (0.10±0.02)μm and (1.00±0.70)μm respectively. Compared with experiment data, the computer simulation has well accuracy and operation performance.

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