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博士论坛

人造微孔骨结构RP过程仿真研究

高新瑞[1]，张树生[2]，侯增选[2]

1.海南大学 信息科学技术学院，海口 570228

2.西北工业大学 现代设计与集成制造技术教育部重点实验室，西安 710072

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摘要 在人造骨设计中，为了能使人造骨部分与人体骨组织在一起生长、融合，就要求人造骨具有与人体骨组织一样的微孔结构。边界面与实体模型很难作到这一点。通过将多面体三向DEXEL模型转换为小体素模型，并设置小体素的透明度属性为全透明，实现人造微孔骨结构设计。将沿y轴方向相同属性的小体素合并为一个大体素，模拟激光头的一次烧结轨迹，通过层层堆叠方式实现RP过程仿真。在Java2.0与Java3D环境下编程实现并验证了所有算法。

关键词 多面体 三向DEXEL模型 体素模型 体素透明度属性 人造微孔骨结构 RP过程仿真

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Research on RP procedure simulation of artificial porous bone structure

GAO Xin-rui[1]，ZHANG Shu-sheng[2]，HOU Zeng-xuan[2]

1．Information Science Technology Institute of Hainan University，Haikou 570228，China

2．Key Laboratory of Contemporary Design and Integrated Manufacturing Technology，Ministry of Education，Northwestern Polytechnical University，Xi’an 710072，China

Abstract

In the design of artificial bones，in order to make it live together with the human bone，it should have the same porous structure as the human bone.But the Brep or solid model can’t achieve this.By transforming the three direction DEXEL model of polyhedrons into its VOXEL model and setting transparency attributes of VOXELs，the porous structure of artificial bone can be designed.By merging the same attribute VOXELs along y axis，a big VOXEL is formed.By this big VOXEL，the once sintering procedure of RP laser head is simulated.Layer by layer，the whole product is produced.Under Java2.0 and Java3D，these algorithms are tested and some design examples are given.

Key words polyhedrons three direction DEXEL model VOXEL model transparency attribute of VOXEL porous structure of artificial bone RP procedure simulation

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通讯作者 高新瑞 xr_gao2002@yahoo.com.cn