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粉末烧结钕铁硼激光熔凝层的易磁化轴取向

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摘 要：研究当各向异性粉末烧结$Nd_{15}Fe_{77}B_8$永磁体的磁化方向分别与*x*，*y*，*z*轴平行时，其上激光熔凝层中$Nd_2Fe_{14}B$胞柱晶的易磁化轴的取向特征。采用XRD，SEM，Bitter粉纹等实验方法对粉末烧结$Nd_{15}Fe_{77}B_8$永磁体表面的激光熔凝层进行了分析。结果表明：当磁体的磁化方向分别与*x*，*y*轴平行时，其上激光熔凝层中$Nd_2Fe_{14}B$胞柱晶的易磁化轴具有与粉末烧结基体相同的取向；而当磁体的磁化方向与/z/轴平行时，其上激光熔凝层中的$Nd_2Fe_{14}B$胞柱晶的易磁化轴在*xoy*平面内随机分布。在激光快速熔凝条件下，磁体表面激光熔凝层中的胞状$Nd_2Fe_{14}B$的择优生长方向为［100］晶向。

关键字：激光表面熔凝；$Nd_2Fe_{14}B$；易磁化轴；晶体生长方向

Arrangement of easy magnetization axis of cellular column $Nd_2Fe_{14}B$ in laser melting/solidification pool on sintered $Nd_{15}Fe_{77}B_8$ magnets

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Abstract: The arrangements of the easy magnetization axis ［001］ of cellular $Nd_2Fe_{14}B$ of the cellular column zone in the laser melting/solidification pool, were investigated by XRD, SEM, and the Bitter method, on sintered Nd_{15}-$Fe_{77}B_8$ magnets. The results show that the cellular columns of $Nd_2Fe_{14}B$ at the zone are straight and parallel to *z*-axis. If the magnetization direction of the magnets is originally parallel to *x*, *y*-axis respectively, the cellular Nd_2Fe_{14}-B of the zone in the laser melting/solidification pool has the same arrangement of the easy magnetization axis as the magnets. But if the magnetization direction of the magnets is originally parallel to *z*-axis, the easy magnetization axis of the cellular $Nd_2Fe_{14}B$ at the zone is in the *xoy* plane. And the preferential growth direction of all the cellular $Nd_2Fe_{14}B$ in the laser melting/solidification pool is ［100］ under the condition of laser rapid solidification.

Key words: laser melting/solidification; $Nd_2Fe_{14}B$; easy magnetization axis; crystal growth direction

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