doi：10.3969/j.issn.1001-3849.2019.07.001

GCr15轴承内圈磁粒研磨光整实验

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摘要： 利用磁粒研磨加工工艺对轴承内圈进行光整加工实验，以降低其表面粗糙度值为目的，通过Ansoft Maxwell磁场模拟软件对磁极三种形状进行仿真分析，得到磁极开轴向槽磁场强度大，在此基础上研究了磨料粒径、磁极转速和研磨液用量对表面粗糙度值的影响。结果表明：当磨料粒径为185 μm时，磁极转速为600 r/min、研磨液用量为6 mL，光整加工60 min，轴承内圈的表面粗糙度值由原始的0.51 μm下降至0.10 μm，表面的划痕、刀微纹基本全部去除，表面形貌的均匀性较好，表面的显微硬度由原始的820 HV变为了900 HV，研磨后的表面强度增加了。

关键词： 磁粒研磨；磁场模拟；粗糙度值；表面形貌；显微硬度
中图分类号： TG147 **文献标识码：** A

Experimental Study on GCr15 Bearing Inner Ring Magnetite Grinding and Finishing

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Abstract: In order to reduce the surface roughness of bearing inner rings, the magnetic pole shape was simulated and analyzed by Ansoft Maxwell magnetic field simulation software. It was found that the magnetic field intensity of magnetic pole slot was high. Based on this, the influence of abrasive particle size, magnetic pole speed and the amount of grinding fluid on the surface roughness was studied. The results showed that when the abrasive particle size was 185 μm, the speed of magnetic pole was 600 r/min, the amount of grinding fluid was 6 mL and the finishing time was 60 min, the surface roughness of bearing inner ring decreased from 0.51 μm to 0.10 μm. The surface scratches and knife micro-lines were basically removed. The surface morphology was uniform. The surface micro-hardness changed from 820 HV to 900 HV, and the surface strength increased after grinding.

Keywords: magnetic particle grinding; magnetic field simulation; roughness value; surface morphology; microhardness

随着装备制造业、机械智能制造业的不断发展，轴承作为大型机械装备的子部件，对其自身的精度、强度和表面质量具有很高的要求[1-2]。因为轴承钢都是通过调制热处理使基体组织晶粒细化，使表面晶粒排布较为均匀致密，表层硬度较大[3-4]。由于轴承都是以高转速负荷在运转，疲劳失效和磨损

收稿日期：2019-01-17 修回日期：2019-02-25
基金项目：国家自然科学基金(51775258)