

# 磁针磁力研磨去除涡轮轴内壁积碳

陈燕, 胡玉刚, 巫昌海, 杨大鹏, 韩冰

(辽宁科技大学 机械工程与自动化学院, 辽宁 鞍山 114051)

**摘要:** **目的** 去除航空发动机涡轮轴内壁的积碳。**方法** 采用磁针磁力研磨法对涡轮轴内壁积碳进行研磨去除, 利用 3D 超景深电子显微镜对研磨去除积碳前后的涡轮轴内壁表面形貌进行观察, 利用扫描电子显微镜对涡轮轴内壁积碳成分和涡轮轴基体成分进行测定与分析, 并对磁针磁力研磨去除积碳后的涡轮轴内壁成分进行测定, 与基体成分进行对比, 验证积碳去除的彻底性。**结果** 涡轮轴内壁积碳经磁针磁力研磨后被完全去除; 积碳成分中包括的元素有 O、C、Na、Al、Si、Ti、Fe、Zr、Mo、S、K, 基体成分中包括的元素有 C、Al、Si、Ti、Zr、Mo, 经磁针磁力研磨存有积碳的涡轮轴内壁后, 测得内壁成分中包含的元素有 C、Al、Si、Ti、Mo、O、Fe, 表明经磁针磁力研磨后, 涡轮轴内壁积碳被完全去除。**结论** 成分测定分析的验证结果表明了从表面形貌分析中得到的涡轮轴内壁积碳被完全去除的结果的正确性, 同时也表明了用磁针磁力研磨去除涡轮轴内壁积碳的方法具有可行性, 并且可以达到较好的效果。

**关键词:** 磁针磁力研磨; 积碳; 表面形貌; 扫描电镜; 涡轮轴; 去除机理

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## Removal of Carbon Deposition on the Inner Wall of Turbo Shaft by Magnetic Needle Grinding

CHEN Yan, HU Yu-gang, WU Chang-hai, YANG Da-peng, HAN Bing

(School of Mechanical Engineering and Automation, University of Science and Technology Liaoning, Anshan 114051, China)

**ABSTRACT:** The work aims to remove carbon deposition from the inner wall of aero-engine turbo shaft. Magnetic needle grinding method was used to remove the carbon deposition on the inner wall of the turbo shaft. The surface morphology of the inner wall of the turbo shaft before and after removal of carbon deposition by grinding was observed by 3D ultra depth of field electron microscope. Scanning electron microscope was used to measure and analyze the components of carbon deposition on the inner wall of turbo shaft and the matrix components of turbo shaft. At the same time, the composition of inner wall of turbo shaft after the removal of carbon deposition by magnetic needle grinding was determined and compared with the matrix composition, to verify the thoroughness of carbon deposition removal. Carbon deposition on the inner wall of turbo shaft was completely removed by magnetic needle grinding. The elements in the carbon deposition were O, C, Na, Al, Si, Ti, Fe, Zr, Mo, S

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**作者简介:** 陈燕(1963—), 女, 博士, 教授, 主要研究方向为精密加工。邮箱: laochen412@gmail.com

**Biography:** CHEN Yan (1963—), Female, Doctor, Professor, Research focus: precision machining. E-mail: laochen412@gmail.com

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