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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Rare earths thermo-chemical treatment - Part 1: Carburizing
and carbonitriding**

稀土化学热处理 第1部分：渗碳及碳氮共渗

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 1 of GB/T 45983 Chemical Heat Treatment of Rare Earths. GB/T 45983 has been published in the following parts.

- Part 1: Carburizing and carbonitriding.

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document is proposed and coordinated by the National Technical Committee for Standardization of Heat Treatment (SAC/TC75).

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Introduction

Chemical heat treatment is one of the important methods to effectively improve the surface hardness, wear resistance and fatigue resistance of materials or workpieces.

When heated to a certain temperature in a certain medium, the adsorption and diffusion or reaction diffusion of elements on the surface of the workpiece occurs through certain components in the medium.

The heat treatment process changes the chemical composition of the workpiece or material surface to improve the surface performance. Common chemical heat treatments such as carburizing or nitriding It is widely used, but there are problems such as long process cycle, high energy consumption, easy oxidation, decarburization and deformation of parts. Chinese scholars have invented rare earth chemical thermal Processing technology.

Rare earth chemical heat treatment is to introduce rare earth elements into the furnace along with carburizing or carbonitriding medium, nitriding or nitrocarburizing medium, etc.

By increasing the interface transfer coefficient of active atoms on the workpiece surface, the carbon potential or nitrogen potential of the atmosphere is quickly established in the furnace, the penetration rate is accelerated, and the process cycle is shortened.

On the other hand, rare earth elements can penetrate into the surface of the workpiece, improve the structure of the diffusion layer through microalloying, and further increase the service life of the workpiece.

Therefore, rare earth carburizing and carbonitriding (nitriding and nitrocarburizing) can bring obvious economic benefits and have a wide range of industrial application needs and market demand. Field prospects.

GB/T 45983 "Rare Earth Chemical Heat Treatment" specifies the application scope, equipment, process and Process control, quality inspection, safety, health and environmental protection, energy consumption and product report requirements are required for the use of rare earth chemical heat treatment Provide technical guidance to enterprises and scientific research departments, and provide reference for improving heat treatment production efficiency, saving energy and reducing emissions, and achieving low-carbon goals.

GB/T 45983 "Chemical Heat Treatment of Rare Earths" is intended to be divided into the following parts.

- Part 1: Carburizing and carbonitriding. The purpose is to reduce the working The process temperature can be reduced, the process cycle can be shortened, the carburized layer structure can be improved, and the surface hardness, strength and wear resistance of the workpiece can be increased.

- Part 2: Nitriding and nitrocarburizing. The purpose is to shorten the working time by adding rare earth to the nitriding and nitrocarburizing media.

process cycle and improve the hardness, strength and wear resistance of the workpiece.

- Part 3: Boriding. The purpose is to shorten the process cycle and improve the structure of the boronized layer by adding rare earth to the boronizing medium.

Weaving can improve the wear resistance of the workpiece.

Rare earth chemical heat treatment Part 1: Carburizing and carbonitriding

1 Scope

This document specifies the process code, workpiece to be treated, rare earth penetrant, equipment, process and process control, quality inspection, etc.

Requirements for testing, safety, health and environmental protection, energy consumption and product reporting.

This document applies to gas carburizing and carbonitriding heat treatment of steel parts using methanol or nitrogen-methanol as carrier gas.

2 Normative references

GB/T 224

GB/T 230.1

GB/T 4340.1

GB/T 6394

GB/T 7232

GB/T 8121

GB/T 9450

GB/T 9452

GB/T 12603

GB/T 13324

GB/T 15676

GB 15735

GB/T 15822.1

GB/T 16924

GB/T 17358

GB/T 19944

GB/T 25744

GB/T 30822

GB/T 30825

GB/T 34889

GB/T 37885

GB 39176