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PEOPLE'S REPUBLIC OF CHINA**

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**Nanotechnologies-Measurement of iron content in polysaccharide
coated superparamagnetic iron oxide solution-Inductively coupled
plasma atomic emission spectrometry**

纳米技术 多聚糖超顺磁氧化铁溶液铁含量测量 电感耦合等离子体发射光谱法

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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 is required.

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.

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Introduction

Polysaccharide superparamagnetic iron oxide is a nanoparticle with superparamagnetic properties formed by highly biocompatible polysaccharides modified on the surface of nano-iron oxide.

Its sterile aqueous solution has been used in preclinical and clinical applications in the fields of disease diagnosis and treatment, including magnetic resonance imaging, magnetic hyperthermia, and stem cell labeling and tracing.

In addition, due to its excellent biosafety and magnetic response performance, it is widely used in life sciences, environmental management, industrial and agricultural production.

Therefore, in-depth research on the performance indicators of polysaccharide superparamagnetic iron oxide solution and the establishment of high Effective measurement methods and stable quality control systems will greatly promote the development of this type of nanomedicine.

The iron content of polysaccharide superparamagnetic iron oxide solution is the most critical indicator in its quality control system. Accurate measurement of iron content is very important.

The dosage of this type of drug is directly determined, which in turn affects a number of medical applications, including iron supplementation, magnetic resonance imaging, magnetic thermal therapy, and enzyme catalysis simulation.

However, unlike traditional small molecule drugs, the iron content measurement of this type of solution is affected by its own nanostructure, and the conventional method Therefore, the formulation of a national standard for the measurement of iron content in polysaccharide superparamagnetic iron oxide solutions is of great significance to the application of this type of drug.

The development is of great significance.

At present, there is no measurement standard for the iron content of polysaccharide superparamagnetic iron oxide nanoparticles in China. Inductively coupled plasma optical emission spectroscopy The method is a general technique for measuring metal elements (including iron) and is specified in the Chinese Pharmacopoeia (2020 edition).

In order to meet the needs of new medical technology research, this document has been developed to expand and improve the original pharmacopoeia methods by combining nanotechnology.

Nanotechnology Polysaccharide Superparamagnetic Iron Oxide Solution Iron content measurement Inductively coupled plasma Emission spectroscopy

1 Scope

This document describes the method for measuring the iron content in polysaccharide superparamagnetic iron oxide solutions, including the measurement principle, instruments, apparatus and reagents.

Solution preparation, measurement steps, result calculation, uncertainty analysis and measurement report.

This document applies to the measurement of iron content in iron oxide nanoparticles in aqueous solution using inductively coupled plasma optical emission spectrometry.

2 Normative references

GB/T 601

GB/T 622

GB/T 4842

GB/T 6682

JJG 768

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Polysaccharide

A type of polymer molecule formed by glucose monomers linked by glycosidic bonds.

3.2 Superparamagnetic iron oxide

When the size of the single magnetic domain iron oxide particles with ferromagnetism or ferrimagnetism is smaller than a certain critical value, the iron oxide particles or particle aggregates collective.

3.3 Plasma

An ionized gas with a degree of ionization greater than 0.1% and equal positive and negative charges.

[Source. GB/T 30902-2014, 3.1]

3.4 Inductively coupled plasma

Plasma is generated by high-frequency (about 2500 Hz) electromagnetic field induction.

The high-temperature and electric-field-free gas region is used as the observation area.

[Source. GB/T 4470-1998, 3.2.4.3]

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