量子点技术地位及市场前景发展分析研究报告

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一、报告简介

观研报告网发布的《量子点技术地位及市场前景发展分析研究报告》涵盖行业最新数据，市场热点，政策规划，竞争情报，市场前景预测，投资策略等内容。更辅以大量直观的图表帮助本行业企业准确把握行业发展态势、市场商机动向、正确制定企业竞争战略和投资策略。本报告依据国家统计局、海关总署和国家信息中心等渠道发布的权威数据，以及我中心对本行业的实地调研，结合了行业所处的环境，从理论到实践、从宏观到微观等多个角度进行市场调研分析。

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二、报告目录及图表目录

摘要INTRODUCTIONMOTIVATION

Among the many subsets of nanomaterials, quantum dots (QDs) are like no other. At dimensions typically below 10 nanometers, nanocrystalline (nc) semiconductors (SC), metals, and magnetic materials can all exhibit extraordinary quantum confinement phenomenon. Basically, at these dimensions, their physical size encroaches upon the fundamental quantum confinement dimensions of orbiting electrons that are uniquely prescribed by their atomic nucleus. Within the regime of these critical dimensions, QDs exhibit distinctly different behavior from their bulk form, which manifests itself, for example, in distinctly different optical, electronic, and magnetic properties.

Today, scientists can precisely synthesize nanocrystalline materials at these critical dimensions and thereby systematically tune their quantum confining behavior. As a result there is currently enormous interest to exploit and capitalize on the unique properties exhibited by QD materials. As a harbinger for future business developments, colloidal QD-bioconjugates are among the first wave of commercial product applications stimulating market interest. Primarily, these have quickly established a niche market in the life sciences and biomedical communities, where they provide unrivalled cellular imaging and therapeutic detection capabilities. Other promising prototype developments of SC QDs now on the commercial-horizon range include: a new generation of flash memory devices; nanomaterial enhancements for improving the performance of flexible organic light-emitting diodes (LEDs), as well as solid-state white-LED lighting; and a core technology used in flexible solar panel coatings.

With these impending commercial developments and their enormous business potential, this report provides a timely assessment of quantum dot materials—where they are currently at, and where they might be in the foreseeable future.

STUDY GOAL AND OBJECTIVES

The primary objective of this report is threefold: to assess the current state-of-the-art in synthesizing QDs; to identify the current market players seeking to exploit QD behavior; and to evaluate actual or potential markets in terms of application, type, and projected

market revenues.

SCOPE OF REPORT

Since their parallel discovery in Russia and the U.S. almost 25 years ago, SC QDs, until quite recently, have resided exclusively in the domain of solid state physics, where they have been fabricated using expensive and sophisticated molecular beam epitaxy (MBE) or chemical vapor deposition (CVD) equipment. However, in a relatively short time frame this situation has changed dramatically with the recent commercial availability of colloidal QDs synthesized by less expensive wet-chemical processes. Practically, the availability of QDs in a colloidally dispersed form will help demystify these somewhat esoteric materials. Most importantly, colloidal-QDs now provide access to a much broader audience, which promises to further widen their potential market exploitation.

Current and future applications of QDs impact a broad range of industrial markets. These include, for example, biology and biomedicine; computing and memory; electronics and displays; optoelectronic devices such as LEDs, lighting, and lasers; optical components used in telecommunications; and security applications such as covert identification tagging or biowarfare detection sensors.

This report probes in considerable depth the early pioneers and champions in this field both in industry, government, and academic laboratories. The most active organizations, promising technical applications, and developments realizable within the next 5 years, will all be highlighted.

CONTRIBUTIONS OF THE STUDY AND TARGET AUDIENCE

This report represents a major update of the BCC Research report Quantum Dots: Technologies and Commercial Prospects, published in April 2005. The most significant revisions in the new edition include:

An extensive updated patent analysis

An in-depth assessment of the unfolding commercial markets

Progress in the synthesis and commercial scaleup by QD producers

Updated company profiles of the synthesizers and end users dictating market development

Updated 5-year market projection analysis of the emerging QD market
It represents the second exclusive report to focus on QD nanomaterials from the perspective of their technology, applications, and future business prospects. Thus, this up-to-date technical assessment and business analysis should prove an especially valuable resource to individuals and organizations seeking more insight into the current status of QDs, their stand-alone capabilities within the spectrum of nanomaterials, and time-to-market commercial development. This comprehensive technical and business assessment on the current status of the QD-based industry should prove informative to nanomaterials manufacturers, investors seeking near-term commercialization opportunities, technologists confronted with nanomaterial device integration issues, and companies specifically interested in exploiting QDs for biological, biomedical, electronic, energy storage, optics, optoelectronics, and security applications.

METHODOLOGY AND SOURCES OF INFORMATION

This report is primarily derived from the enormous amount of patent and technical literature relating to QDs disclosed in the public domain. In addition, complementary information has also been drawn from the business community, such as company investment news, company profiles, press releases, and personal telephone interviews with selected companies.

ABOUT THE AUTHOR

John Oliver, the author of this report, is the founder of Innov8 Solutions, which provides advanced materials consultation services to various clients. He has over 30 years of industrial research and development (R&D) experience in surface and colloid science, spanning a wide range of materials technology. Primarily, working as a senior scientist at Xerox Research Centre of Canada, he developed an invaluable understanding in advanced materials used in digital printing technologies such as xerography and ink-jet printing. More recently, through his involvements with the Alberta Research Council and several local universities, his interests have evolved into the realm of nanomaterials and microsystems device integration. He has a Ph.D. in Physical Chemistry from McGill University, a BSc degree in Chemistry from Surrey University, U.K. His publications include more than 40 technical articles, 20 patents, and one technical book.目录及图表Chapter-1: SUMMARY