+357 96 030922
info@marketpublishers.com

Atomic Force Microscopy (AFM) Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Offering (Atomic Force Microscopes, Probes, Software), By Grade (Research Grade AFM, Industrial Grade AFM), By Application (Academics, Semiconductors & Electronics, Life Sciences, Material Science, Others), By Region & Competition, 2021-2031F

https://marketpublishers.com/r/A79569D207DDEN.html
Date: January 2026
Pages: 185
Price: US$ 4,500.00 (Single User License)
ID: A79569D207DDEN

Abstracts

The Global Atomic Force Microscopy (AFM) Market is projected to expand from USD 502.25 Million in 2025 to USD 707.22 Million by 2031, achieving a CAGR of 5.87%. AFM employs a high-resolution scanning probe method that uses a sharp-tipped cantilever to assess surface topography and physical characteristics at the nanoscale. Market growth is primarily driven by the ongoing miniaturization of semiconductor components and elevated funding for nanotechnology research, both of which demand precise metrology for defect analysis and quality assurance. This industrial need is substantial; SEMI reported that in 2024, global sales of total semiconductor manufacturing equipment were expected to hit a record $113 billion, highlighting the strong capital expenditure climate that supports the acquisition of inspection systems.

Despite this growth, the technology faces a major obstacle regarding scanning speed relative to optical microscopy. The slow nature of the scanning process constrains sample throughput, making it difficult to incorporate AFM into high-volume manufacturing environments where fast cycle times are critical. As a result, this bottleneck frequently restricts the technology to offline laboratory examinations rather than real-time, inline production monitoring.

+357 96 030922
info@marketpublishers.com

Market Driver

The escalating demand for semiconductor wafer inspection and failure analysis serves as the primary catalyst driving the Global Atomic Force Microscopy (AFM) Market. As fabrication nodes decrease in size, manufacturers depend more on AFM's exceptional vertical resolution to identify non-visual defects and measure critical dimensions that optical techniques cannot resolve. This dependency is amplified by the industry's vast production scale, where accurate metrology is vital for yield management in high-value manufacturing. According to the Semiconductor Industry Association in February 2025, global semiconductor sales attained a record $627.6 billion in 2024, demonstrating the massive industrial activity requiring advanced inspection tools. Consequently, fabrication plants are adopting automated AFM systems to maintain quality control across their growing production lines.

Concurrently, the growth of nanotechnology and nanomaterials research serves as a strong basis for market expansion, supported by continued public funding. AFM is the standard instrument for characterizing material properties at the atomic scale, crucial for studying new composites and biological specimens. This research environment is bolstered by federal grants designed to promote scientific leadership; the National Nanotechnology Coordination Office reported in December 2024 that the President's 2025 Budget requested over $2.2 billion for the National Nanotechnology Initiative. This steady funding enables academic and government labs to purchase advanced equipment, directly generating revenue for major market players. Highlighting this trend, Bruker Corporation reported in 2025 that its BSI NANO segment, which includes its AFM business, achieved fiscal year 2024 revenue of $1.10 billion.

Market Challenge

A critical bottleneck preventing the Global Atomic Force Microscopy (AFM) Market from entering the high-volume manufacturing sector is the inherent limitation in scanning speed. In contrast to optical inspection systems that acquire surface data nearly instantly, AFM depends on a physical probe moving across the sample, a mechanical method that greatly prolongs data collection time. This fundamental restriction causes a significant throughput gap, making standard AFM setups inappropriate for real-time, inline wafer inspection where fast cycle times are a key performance requirement.

This inability to keep pace with production line speeds directly hinders market growth due to the vast scale of modern semiconductor fabrication. The industry operates at

+357 96 030922
info@marketpublishers.com

volumes necessitating rapid metrology solutions to sustain yield without impeding output. According to SEMI, global installed wafer fab capacity reached 40.5 million wafers per quarter during the second quarter of 2024. Given such immense throughput demands, manufacturers cannot accept the latency associated with atomic force microscopy for general inspection. As a result, AFM remains primarily limited to offline failure analysis and R&D tasks, preventing vendors from accessing the significantly larger capital budgets designated for high-speed, inline process control machinery.

Market Trends

The progression of fully automated scanning workflows is transforming the market by removing the steep learning curve once required for atomic force microscopy. While obtaining high-quality nanoscale data previously demanded expert operators to manually tune complex feedback settings, modern systems now utilize intelligent algorithms to autonomously handle tip-sample engagement and scan optimization. This transition toward user-friendly design enables various industries to use AFM for routine measurements without specialized training, expanding access beyond dedicated surface scientists. This operational shift is driving significant financial results; Park Systems reported in February 2025 that its annual sales revenue reached 175 billion KRW in 2024, a figure attributed to the growing adoption of its automated metrology solutions in both industrial and academic fields.

At the same time, the rise of correlative and multi-modal platforms is increasing as researchers demand comprehensive material insights that topography alone cannot supply. By combining AFM with complementary methods like Raman spectroscopy or scanning electron microscopy, these hybrid systems permit the simultaneous collection of physical, chemical, and structural data from the same nanoscale area. This synergy is especially vital for analyzing complex heterogeneous materials where linking structural details with chemical composition is necessary for precise characterization. The need for such multifaceted analysis is actively fueling segment growth; Oxford Instruments stated in June 2024 that its Materials & Characterisation segment achieved revenue of ?252.2 million in its 2024 annual report, representing an 11.4% rise driven by strong sales of its advanced microscopy portfolio, including correlative AFM and Raman systems.

Key Market Players

Bruker Corporation

+357 96 030922
info@marketpublishers.com

Park Systems Corporation

Oxford Instruments plc

Horiba, Ltd.

Hitachi High-Technologies Corporation

Nanosurf AG

WITec GmbH

NT-MDT Spectrum Instruments

NanoMagnetics Instruments Ltd.

Nanonics Imaging Ltd.

Report Scope

In this report, the Global Atomic Force Microscopy (AFM) Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Atomic Force Microscopy (AFM) Market, By Offering

Atomic Force Microscopes

Probes

Software

Atomic Force Microscopy (AFM) Market, By Grade

Research Grade AFM

Industrial Grade AFM

+357 96 030922
info@marketpublishers.com

+357 96 030922
info@marketpublishers.com

Japan

Australia

South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Atomic Force Microscopy (AFM) Market.

Available Customizations:

Global Atomic Force Microscopy (AFM) Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

+357 96 030922
info@marketpublishers.com

Contents

+357 96 030922
info@marketpublishers.com

6. NORTH AMERICA ATOMIC FORCE MICROSCOPY (AFM) MARKET OUTLOOK

7. EUROPE ATOMIC FORCE MICROSCOPY (AFM) MARKET OUTLOOK

+357 96 030922
info@marketpublishers.com

+357 96 030922
info@marketpublishers.com

8. ASIA PACIFIC ATOMIC FORCE MICROSCOPY (AFM) MARKET OUTLOOK

+357 96 030922
info@marketpublishers.com

9. MIDDLE EAST & AFRICA ATOMIC FORCE MICROSCOPY (AFM) MARKET OUTLOOK

+357 96 030922
info@marketpublishers.com

10. SOUTH AMERICA ATOMIC FORCE MICROSCOPY (AFM) MARKET OUTLOOK

11. MARKET DYNAMICS

+357 96 030922
info@marketpublishers.com

+357 96 030922
info@marketpublishers.com

17. ABOUT US & DISCLAIMER

+357 96 030922
info@marketpublishers.com

I would like to order

Product name: Atomic Force Microscopy (AFM) Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Offering (Atomic Force Microscopes, Probes, Software), By Grade (Research Grade AFM, Industrial Grade AFM), By Application (Academics, Semiconductors & Electronics, Life Sciences, Material Science, Others), By Region & Competition, 2021-2031F

Product link: https://marketpublishers.com/r/A79569D207DDEN.html

Price: US$ 4,500.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:
info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page https://marketpublishers.com/r/A79569D207DDEN.html