



Global Markets for Nanocomposites, Nanoparticles, Nanoclays, and Nanotubes

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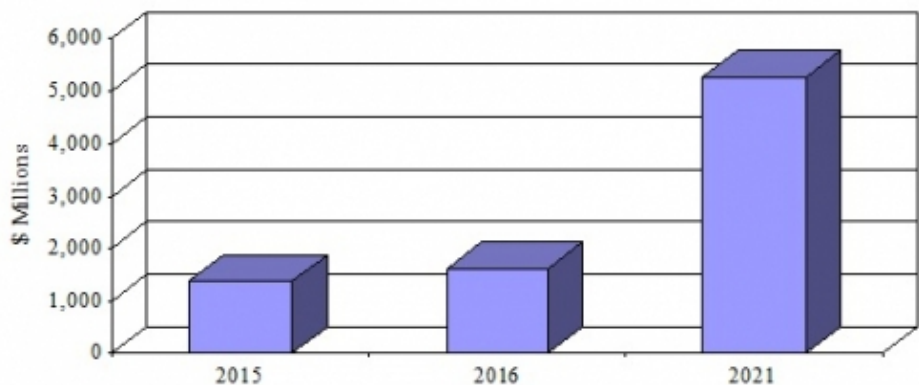
- Analyze nanocomposites that are in commercial use or under development, associated technologies and applications.
- Provide suppliers of advanced materials, entrepreneurs, investors and others with information on emerging nanocomposite technologies.
- Evaluate nanocomposites industry structure, market shares and applications along with a realistic assessment of their commercial potential.
- Project future demand in these segments and evaluate the challenges that must be overcome for each segment to realize its potential in order to estimate the probability of successful commercialization.



Highlights

- The global nanocomposite market, in value terms, should reach \$5.3 billion by 2021 from \$1.6 billion in 2016 at a compound annual growth rate (CAGR) of 26.7%, from 2016 to 2021.
- The global market, in unit terms, should reach 733,220 metric tons by 2021 from 308,322 metric tons in 2016 at a CAGR of 18.9%, from 2016 to 2021.
- Clay nanocomposites accounted for the largest portion of total nanocomposite consumption by value in 2015 with a market share of 56.2%. This share is projected to increase to 57.4% by 2021.

SUMMARY FIGURE
GLOBAL NANOCOMPOSITE MARKET, 2015-2021
(\$ MILLIONS)



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Source: BCC Research

Introduction & Scope

INTRODUCTION

STUDY BACKGROUND

Nanocomposites have been used commercially since Toyota introduced the first polymer/clay nanocomposite auto parts in the 1980s. Recently, advances in the ability to characterize, produce and manipulate nanometer-scale materials have led to their increased use as fillers in new types of nanocomposites.

Manufacturers now mix nanoparticulate metals, oxides and other materials with polymers and other matrix materials to optimize the composite's properties with respect to color/transparency, conductivity, flame retardancy, barrier properties, magnetic properties and anticorrosive properties, as well as tensile strength, modulus and heat distortion temperature. These composites offer users significantly enhanced properties compared to conventional composite and noncomposite materials.

Global consumption of nanocomposites has increased significantly since BCC Research published its last market analysis in early 2014, reaching 261,779 metric tons (MT), with an estimated value of nearly \$1.4 billion in 2015. Nanocomposite consumption is growing rapidly, and is expected to reach close to 733,220 MT, or \$5.3 billion in value terms, by 2021.

STUDY GOALS AND OBJECTIVES

Such rapid growth has raised expectations regarding nanocomposites' commercial potential. The overall goal of this updated report is to provide suppliers of advanced materials, entrepreneurs, investors and others with information concerning emerging nanocomposite technologies and applications, along with a realistic assessment of their commercial potential.

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Specific objectives include identifying segments of the nanocomposite market with the greatest commercial potential in the near to mid-term (i.e., 2016 to 2021), projecting future demand in these segments, and evaluating the challenges that must be overcome for each segment to realize its potential in order to estimate the probability of successful commercialization.

INTENDED AUDIENCE

This report is intended especially for nanocomposite and nanomaterials marketing executives, entrepreneurs, investors, venture capitalists and other readers with a need to know the direction in which the nanocomposite market is headed in the next five years. Other readers who should find the report particularly useful include officials of government programs, such as the U.S. National Nanotechnology Initiative, which promote the development of the nanotechnology industry. The report's findings and conclusions should also be of interest to the broader nanotechnology community.

SCOPE AND FORMAT

The report addresses the global market for nanocomposites. Nanocomposites are a class of composites that have at least one component with nanoscale dimensions or structural features. This study, however, excludes certain materials (e.g., rubber, to which carbon black nanoparticles have been added) that technically fit the definition of nanocomposites but have been in commercial use for decades.

The study format includes the following major elements:

- Executive summary.
- Definitions.
- Milestones in the development of nanocomposites.
- Nanocomposites that are in commercial use or under development, associated technologies and applications.
- Nanocomposites with the greatest commercial potential through 2021.
- Global nanocomposite market trends from 2015 to 2021.
- Factors that will influence the long-term development of the nanocomposites market.
- Nanocomposites industry structure and market shares.

METHODOLOGY AND INFORMATION SOURCES

Projecting the market for emerging technologies such as nanocomposites, many with commercial potential that has not yet been fully proven, is a challenging task. This report uses a multiphase approach that includes both primary and secondary research methodologies to identify the nanocomposites with the greatest commercial potential and to quantify their market.

In the first phase of the analysis, BCC Research identified a long list of nanocomposites, including those that are still under development. BCC Research then undertook a literature review to identify those nanocomposites that are unlikely to make it into commercial production before 2019, resulting in a short list of nanocomposites that have near- to mid-term commercial potential.

In phase two, BCC Research mapped these nanocomposites against potential end-user industries and applications, such as the automotive and food packaging industries, to identify the nanocomposites with the greatest commercial potential in the time frame covered by this report. Selection criteria included size of the market, characteristics of competing materials and similar considerations.

In the third phase, BCC Research focused on quantifying the potential market for these high-potential nanocomposites and identifying the main prerequisites for commercial success. Various methodologies and data sources were used to develop the projections, including trend-line projections, input-output analysis and estimates of future demand from industry sources.

The report includes detailed descriptions of the data sources, assumptions and methodologies that were used in developing the market projections. BCC Research's

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intent is to let readers judge the validity of its projections for themselves, thus enabling them to develop alternative market scenarios as they see fit.

ANALYST'S CREDENTIALS

Andrew McWilliams, the author of this report, is a partner in the Boston-based international technology and marketing consulting firm 43rd Parallel, LLC. In addition to being the author of the previous (2014) edition of this report, he has authored numerous other BCC Research studies of the nanotechnology and related fields, including:

- NAN031F Nanotechnology: A Realistic Market Assessment.
- NAN015H Advanced Ceramics and Nanoceramic Powders.
- NAN017D Nanostructured Materials for the Biomedical, Pharmaceutical, and Cosmetic Markets.
- NAN017E Nanostructured Materials for Energy, Catalysis and Structural Applications.
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- NAN015G Advanced Ceramics and Nanoceramic Powders.
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