Nanomaterials from NANOMAT – Manufacturing, Processing, and Applications

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NANOMAT, INC.
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Why Nanomaterials?

- New Technologies
- New Products
- New Markets
- Financial Rewards
What are Nanomaterials?

- Nanoparticles and nanostructured materials
- Grain size on the order of $10^{-9}$ m or nm
- Extremely large specific surface area
- Manifest fascinating and useful properties
- Structural and non-structural applications
- Stronger, more ductile materials
- Chemically very active materials
Benefits of Nanomaterials

✓ Tunable/tailorable chemical, mechanical, and physical properties due to extremely fine grain size (1-100 nm)
✓ Superior formability and potential superplasticity
✓ Possess high strength, toughness, and ductility
✓ Possess enhanced activity (extremely large specific surface area)
✓ Reduced thermal conductivity
✓ Dispersoids can be utilized to further increase strength
✓ Reduced energy costs
Representative Applications

- Biomedical Devices
- Drug-delivery
- Flat-panel displays
- Medical Imaging
- High-energy batteries
- Sensors
- Paints and pigments
- Automobile components
- Formable ceramics
- High-power magnets
- Smart structures

- CMP slurries
- KE penetrators/warheads
- Catalysts
- Phosphors
- Dielectrics
- Fuel cells
- Optical devices
- Cutting tools
- Cosmetics
- Aerospace components

Proprietary Applications
Why NANOMAT, INC.?

- Process Capabilities
- Production Facilities
- Analytical Capabilities
- Variety of Products
- Stability and Profitability
NANOMAT, INC. Core Competency

Experts at manufacturing virtually any nanomaterial by Chemical, Mechanical, Physical, and Combinations thereof

- Sol-Gel Synthesis
- Plasma Synthesis
- Polyol and other Chemical Synthesis
- Hydrothermal Synthesis
- Mechanical Alloying
- Mechanochemical Synthesis
- Other Proprietary Methods (Chemical, Mechanical, and Physical)
NANOMAT, INC.’s Facilities

- 45,000 ft²
- Chemical synthesis
- Mechanochemical synthesis
- Mechanical alloying
- Plasma synthesis
- Transmission electron microscope
- Scanning electron microscope with EDS
- FT-IR/UV-Vis Spectrometers
- Mass Spectrometers

- Metallograph
- Universal testing machine
- Mechanically-fluidized vacuum (MFV) furnaces
- X-ray diffractometer
- High-Temperature S DSC/DTA/TGA
- 75-ton hot-press
- High-temperature atmosphere and vacuum furnaces
- Many more
• **Age of Company:** Founded in 1995
• **Number of Employees:** 25, to be 28 in the next two months
• **Annual Revenue:** Confidential

• **Approximate Revenue Breakdown:**
  90-95% – Commercial Sales
  5-10% – Government and other R & D Contracts/Grants

• **Ownership and Management**
  All employees are stockholders in the subsidiaries
Nanomat Products

Tungstic acid gel
Elemental tungsten
W-Mo Solid Solution
W-Ta Solid Solution
W-Re alloy
W-Ni alloy

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Nanomat Products

Cu-coated W

WC-Co

AlN

B₄C

TiB₂

SiC

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Nanomat Products

Fe

Co

Fe-Co Alloy

CoPt Alloy

Fe-Co Alloy

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Nanomat Products

V$_2$O$_5$

TiO$_2$

γ-Fe$_2$O$_3$

Nano Gold (8-10 nm)

Talc

CaCO$_3$

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**Nanomat Products**

- **Nano Al**
- **Nano Al Rods**
- **Nano Ni**
- **Nano Re**
Nanomat Products

Nano Ni-20Fe

Nano Ni-20Fe

Nano Au
Nanomat Products

Nano ZnO

Nano ZnWO₄

Nano CeO₂
Nanomat Products

Nano Anatase TiO₂

Nano Rutile TiO₂

Nano Y₂O₃
Nanomat Products

Nano Al₂O₃

Nano WO₂

AlON

Nano Si

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Flexible Solid Photochromic Sheets

Before Exposure to Sunlight

After Exposure to Sunlight

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NANOMAT, INC. IP Strategy

- Trade Secrets and Know-how
- U. S. and International Patents
- Provisional Patents
- Trademarks
NANOMAT, INC.’s Business Model Incubator to Develop Nanomaterials

Products

Nanova™, LLC
NanoTalc™
NanoCalc™

NanoFerro™
NanoMR™

NanoTiO₂
Nano W-Cu

$10 Billion

$10 Billion

$20 Billion

Go Public

Go Public

Go Public
Why You?

- Diversity of Products
- Applications Development
- Manufacturing Capabilities
- Sales and Distribution Channels
- Financial Resources
What is in it for you?

NANOMAT, INC.

Vendor–Buyer Relationship

Joint Venture or Strategic Partnership Relationship

Contractual Relationship

Soaring Profits
Summary

NANOMAT currently possesses the technologies to deliver nanomaterials to the marketplace.

NANOMAT is currently selling numerous nanomaterials for a wide variety of proprietary developmental applications.

NANOMAT is currently in discussions with domestic and international investors for spinning off certain technologies into separate companies.
Further Information

Please contact Srikanth Raghunathan at NANOMAT, INC. for additional information on nanomaterials, nanotechnologies, and their applications

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