Strategic Considerations for Managing a Nanotechnology Patent Portfolio

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Presentation Agenda

- Nanotechnology overview
- What are the key considerations in managing a global patent portfolio?
- Patents as strategic business tools
- Nanotechnology trade secrets
- How does the patenting of nanotechnology inventions differ from other fields?
- IP landscape for nanotechnology-based inventions
- Nanotechnology licensing agreements
Nanotechnology

- Nanotechnology is at the forefront of technology innovation across multiple disciplines, with the common scheme being scale.

- “Nanophase” is a special state of subdivision implying that particles or atomic clusters have average dimensions smaller than approximately 100 nm (100x10^{-9} m)

Cascade Blue/SiO$_2$ Nanoparticle (R=4, H=100, X=1)
Nanotechnology
## Nano-Enabled Drug Delivery Technologies

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Nano-Enabled Therapeutics & Medical Technologies

Dendrimer
Block Copolymers
Nanojacket
Polymeric Micelle
Gold Nanoshell
Quantum Dots

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Global Patent Protection

Development of a global patent strategy is critical to the commercialization of products and success of nanotechnology-based businesses

- Development of an effective global patent strategy requires basic understanding of:
  - Products/services
  - Relevant markets
  - Protection mechanisms available in relevant markets
    - National level
    - International level
  - Policing and enforcement of IP worldwide
Patents as Strategic Business Tools

- Patents = key business assets
  - Weak patent position can prevent financing
  - Weak patent position can prevent acquisition
  - Weak patent position can have a negative impact on valuation

- A robust patent portfolio is based upon and supports business strategy. At a minimum, the portfolio:
  - Covers key products/services
  - Creates barriers to entry
  - Provides ammunition against competitors
Defensive Patent Portfolio Strategies

- Strengthening Patent Protection:
  - Strategically file for patents in key markets
  - Refine claim language
    - Make it easy to determine infringement
  - Fill in gaps in claim coverage
    - Layer protection (e.g., genus, species claims)
    - Review claims with inventors and consider design around possibilities
    - Consider alternative claim-drafting strategies
  - Consider in-licensing/acquisition of supplementing IP
Offensive Patent Portfolio Strategies

- An understanding of competitive landscape is key
  - Continuous monitoring efforts
  - FTO, validity opinions

- Blocking competition
  - New patent filings (anticipate competition)
  - Old patent filings/new claims (mining existing disclosures)

- Complementing the portfolio of a potential acquirer
  - May differentiate during acquisition
  - May equalize valuation leverage
Nanotechnology
Trade Secrets

- For many nanotechnology inventions, reverse engineering via simple analysis of product structure is difficult
  - invention best protected as trade secret

- A **trade secret** is a formula, practice, process, design, instrument, or compilation of information that is not generally known or reasonably ascertainable by which a business can obtain an economic advantage over competitors
  - Trade secret protection requires continuous diligence;
    once the technology is revealed it is no longer protected

- Important IP management and licensing strategy:
  - exploit overlap between patents and trade secrets
How Does the Patenting of Nanotechnology Differ from Other Fields?

- Use of overly-broad or unspecific terminology in nanotechnology applications may result in rejection of claims for lack of written description or enablement
  - When possible, well-known terms of art should be used to describe invention
  - Ambiguous or unclear terms should be clearly defined and consistently used in the specification
  - Characterization techniques (e.g., atomic force microscopy (AFM), powder X-Ray diffraction (PXRD), scanning electron microscopy (SEM), particle size analyzers, zeta potential measurements) and sample preparation should be clearly described
How Does the Patenting of Nanotechnology Differ from Other Fields?

- As many nanotechnology inventions already exist at the macroscale, certain claims to nanotechnology inventions could be deemed anticipated by their larger-scale counterparts
  - When drafting claims of a nanotechnology patent application, the improvement offered by the invention should be emphasized
- A mere decrease in size to the nanoscale may be deemed as inherent or obvious
  - Where the invention is not merely a reduction in size, but rather a solution of a new problem, the claims should focus on the solution
Strategies for Building a Nanotechnology Patent Portfolio

- Use recognized language in claims and specification
- Complete listing of prior art should be submitted during prosecution
- Utilize the interdisciplinary aspect of the invention to your advantage
- File patent applications directed to specific industries and fields of use
- Pursue patents with commercial focus/applicability
- Grow from a quality and quantity perspective
IP Landscape for Nanotechnology-Based Inventions

- Broad overlapping patent rights granted to nanotechnology-based inventions have resulted in a **"patent thicket"**

- A **"patent thicket"** is a situation where unreasonable breadth of patent claims of issued patents increases the potential for patent litigation and makes commercialization difficult or impossible for a new entrant in a particular business sector
  - Carbon nanotubes
  - Dendrimers
  - Quantum Dots

- Many fear that the patent thicket will hamper research and innovation in nanotechnology
Maneuvering through the Nanotechnology Patent Thicket

- **Cross-licensing**
  - Parties license patent rights among themselves with promise not to sue one another
  - Viable strategy for late-comers looking to enter saturated nanotechnology field

- **Patent Pooling**
  - Parties assemble overlapping patent rights into single agreement, with each party taking exclusive or non-exclusive rights to a particular field of use covered by combined patents
  - Risk that parties will overvalue own contributions
Nanotechnology
Patent Pooling Strategies

- All parties grant non-exclusive licenses to the pool, e.g., the licensors are free to license their patent(s) outside of the patent pool

- Independent patent expert evaluates which patents are essential in formation of the patent pool and/or divides royalties the pool receives

- Royalty rates distributed based on an formula

- Examine formation of the pool to ensure that it has the smallest possible chance of violating antitrust regulations
Nanotechnology Licensing Agreements

- Nanotechnology-based inventions often present unique technological issues relevant to licensing considerations:
  - Variance in quality and nature of invention
  - Difficulties in reverse engineering
  - Difficulties in up-scaling
  - Government ownership
  - Negative stigma surrounding nanotechnology
  - Nanotechnology “Patent Thicket”
  - Difficulties in policing infringement
Field of Use and Territory

- **Field of Use:**
  - Divide the market and define carefully the Field of Use to get the most out of the nanotechnology invention
  - Identify the best partner for each possible application

- **Territory:**
  - Defining the territory as world-wide is not advisable
  - Identify best partner for each geographical area
  - May be advisable to license in different territories at different times, as technology evolves
Indemnification

- Potential side effects of nanotechnology-based inventions present difficulties for both licensors and licensees

- Conventional license agreements contain limited indemnity provisions that protect the licensee in the event of a third party claim

- In a nanotechnology licensing agreement, the scope of indemnity should be broader in scope:
  - unknown health-related claims
  - environmental-related claims

- Broad scope of indemnity may require licensor to defend and hold harmless the licensee
Indemnification

- To minimize risk and liabilities, licensor may incorporate standards into the licensing agreement as evidence of best industry practices/protocols:
  - ASTM International Standards Worldwide
  - International Organization for Standardization (ISO) Technical Report
  - city ordinances (e.g., Berkeley, CA and Cambridge, MA)

- As long as licensor abides by the articulated standard, licensor may be able to protect itself against liability for unforeseen side effects

- Insurance policies
Enforcement of Nanotechnology Patent Rights

- Infringing activity on the nanoscale can be difficult to observe

- To address difficulties in policing and enforcement, a mutual cooperation provision may be included in the licensing agreement:
  - require licensor to initially disclose features of the licensed technology to the licensee
  - provide updates on critical developments, improvements, advancements and modifications of the licensed technology

- In the event of infringement, mutual cooperation provision may require that both parties participate in gathering evidence and pursuing court action against a third party
Questions and Answers

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