Acquisition of Polymer Technology Group

DSM Obtains a Leading Position in Biomedical Materials

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Biomedical Materials: an Attractive Market

Drivers:
- Ageing demographics
- Obesity
- Patient comfort and convenience
- Minimally invasive surgery
- Overall growth of Medical device industry

Fast growth at 15% per year

- Healthcare spending in general is increasingly rapidly, particularly in more developed countries. This is caused by a number of trends which include:
  - Aging populations in North America, Europe and Japan. Healthcare costs trend up dramatically once people reach the mid 60’s of age
  - Increased obesity which is a risk factor for many diseases such as Type 2 diabetes.
  - Patient demands for increased comfort and convenience which can increase surgical treatments.

These trends, along with other factors such as new treatments and surgical techniques, have driven an ongoing market growth in the medical device industry which is the main consumer of specialty biomedical materials.

- The worldwide medical devices market is estimated at approximately $100 billion in 2005, with the United States being the largest market, followed closely by Western Europe and Japan. In this market the cardiovascular and orthopedics segments are the main focus for biomedical materials.

- In Vision 2010 – Building on Strengths DSM analyzed healthcare trends and matched them with the company’s capabilities in Life Sciences and Materials Sciences. This led to the set-up of the Emerging Business Area Program Biomedical Materials as a new business platform for the mid- and long-term. Objective of this program is to obtain a leading position in the fast growing market of biomedical materials. In 2012 DSM aims to establish over € 100 m in sales in this market.

• DSM distinguishes four main categories of specialty biomedical materials:
  – Medical coatings which are used, for instance, on a vascular or urinary catheter to enhance device maneuverability during minimally invasive cardiology and endovascular procedures. These also help reduce patient discomfort and tissue damage. This category also includes antimicrobial coatings which reduce infection risk. As catheter-associated nosocomial infections represent the fourth-leading cause of mortality in the US, with related treatment costs averaging $3000 per patient, there is a clear market need for this type of coatings.
  – Implant solutions which include polymers used in a structural or functional role for instance in a hip implant or in spinal surgery for degenerative disk disease. These also include fibers used in orthopedic sutures for rotator cuff repairs. The number of these procedures has risen dramatically due to the more active lifestyle people lead. Materials used in coatings and implants must meet stringent requirements for biostability in the human body over the long term. This is about a $900 m market with strong growth and margins.
  – Drug delivery systems using polymers which contain a drug. These devices are implanted in the body to deliver a drug over an extended period of time either locally to exactly where it is needed or systematically at a constant dose to the entire body. This is approximately a $600 m market with very high growth and margins expected over the next five to ten years.
  – Regenerative medicine which is using materials to support cell growth and healing with cells either from the patient or from a donor. Materials used for regenerative medicine really bridge the life sciences and materials world requiring both chemical and biological properties. This is an embryonic area but will grow in importance.
• DSM’s strategy is to build a portfolio of products for this market based on its capabilities in the diverse fields of Life Sciences and Materials Sciences. By being able to provide multiple solutions towards clinical needs in the market, this will bring substantial value to customers. This approach enables DSM to define research platforms that can develop multiple products and technologies and spread resources such as Quality, Regulatory and Sales across product lines and clinical needs.

• In the biomedical market DSM draws strength from:
  – its proven performance in coatings. DSM Desotech is the world's No. 1 supplier of photocurable coatings for optical fiber materials
  – its position as global provider of contract manufacturing services. DSM Pharmaceutical Products provides the highest level of service for the manufacture of active ingredients (API's) and biological products, formulation development, as well as clinical trial and finished dose manufacturing of solids, scheduled drugs, liquids, aseptic liquid and lyophilized products.
  – its position as one of the leading suppliers of polyester based Thermoplastic Elastomers, supplied under the trade name Arnitel®, which gives the company indepth application and process knowledge on this material. This serves as an excellent starting-position to play a leading role in the development of tailored biomedical materials with wear resistant, shock absorbing, elastomeric properties.
  – its track record in the orthopedic market with Dyneema Purity®, an ultra-strong lightweight fiber technology. Orthopedic sutures made with Dyneema Purity® fibers are now the gold standard in rotator cuff repair and are increasingly used in other orthopedic applications.
  – its position as a leading supplier of UHMWPE which coupled with the company’s experience in the orthopedic market and DSM’s R&D competences in materials science give DSM an ideal starting point to develop dedicated materials for various demanding applications in the growing orthopedic segment.
| Market leader in specialty polyurethanes for biomedical applications |
| Products are widely used by leading medical device companies in pacemakers, contact lenses, orthopedic implants, catheters etc. |
| Expected net sales 2008: USD 40 million. More than > 20% annual sales growth in next 3-5 years. |
| PTG co-founder widely recognized as eminent scientist and innovator |

- Through the acquisition of PTG DSM secures a leadership position in biomedical materials. The collective technology in combination with the expanded geographical and customer base will help DSM to develop a unique portfolio of products across the therapeutic needs of the industry.
- PTG is a market leader in bringing new specialty chemicals and polymer-based solutions to critical material-intensive applications in medical and related fields. The main applications for these materials include pacemakers and neural stimulation leads, contact lens materials, spinal applications, catheters and implantable sensors. PTG’s products are widely used by leading medical device companies and have a number of FDA approvals for short and long term use. Its pipeline of new products is built on a strong, proprietary technology platform securing future growth of its business and allowing for strong synergies with DSM’s activities in this growth market.
- In 2008 PTG expects to realize approximately USD 40 million in net sales. The company expects more than 20% sales growth in the next 3-5 years, based on their existing business and the pipeline of new products.
- The co-founder of PTG, Bob Ward, is widely recognized as an innovator and eminent scientist in the field of biomedical materials. As far back as in the 1970’s, Ward has driven the development of novel biomedical products that have significantly benefited mankind. He will continue to work for the company in a key leadership role after the acquisition.
- PTG was founded in 1989. The company is located in Berkeley, CA and has about 100 employees.
The combined portfolio’s of DSM and PTG result in a leadership position in the biomedical materials market based on strong positions in medical coatings, implant solutions and a starting position in drug delivery.

Medical Coatings and Implant Solutions have been the starting points for DSM in this market. In Medical Coatings DSM Biomedical has successfully introduced ComfortCoat™ hydrophilic and antimicrobial coating technology for catheters, guidewires and stent delivery systems. In Implant Solutions PTG has built up a leadership position with its key products Biospan®, Bionate® and CarboSil® across multiple applications such as pacemakers and neural stimulation leads, contact lenses, orthopedic implants, catheters and implantable sensors. Furthermore, in the last year, DSM has launched two development programs with a main focus on orthopedic applications. The first one is Ultra High Molecular Weight Polyethylene (medical grade of DSM’s industrial Stamylan® UH) which forms the basis for new, promising developments in the field of prosthetic hips, knees, shoulders, elbows and spinal disks. The second one is ThermoPlastic Elastomer (the medical grade of the industrial Arnitel®-TPE). This soft, extremely flexible material is particularly suited for applications for replacing soft tissue immediately surrounding the bones. In this segment DSM already built a track record with Dyneema® Purity, which was launched in 2004.

In our more longer-term segment Drug Delivery, multiple customer partnerships are underway. This is an area, although still early stage, with high expectations of growth. In Regenerative Medicine DSM has opted for a “watchful waiting” approach for the time being, exploring opportunities and evaluating how these fit with DSM’s competences.
Biomedical materials typically have a fairly lengthy development cycle due to the regulatory and quality requirements. A coatings application may take two to four years from start to commercialization while a critical drug delivery or implant can take more than five years. It is thus critical to have a strong pipeline of projects at all stages of development. PTG’s project pipeline fits very well with the pipeline that DSM has developed giving us rich opportunities for growth.

PTG has a robust platform of new developments that combines well with the present DSM pipeline.

The combination of materials technologies from DSM and PTG will allow us to accelerate projects and combine resources. An example might be developing new materials that could be used in multiple clinical areas such as a coating and an implant.
High growth expectation results in high market valuation

- In this field DSM competes with companies which can be grouped in three categories:
  - Divisions of larger companies typically supplying a single material or product into the market. Examples are Ticona supplying Ultra High Molecular Weight Polyethylene or Invibio, which is a subsidiary of Victrex supplying PEEK.
  - Small start ups, often from academia, typically funded with venture capital. These companies provide much of the innovation in this industry. As part of its strategy, DSM has invested in several of these companies. Examples include Harland (coating solutions), OPM (ultra-high performance thermoplastic polymers), MicroMuscle (electro-active polymer technology) and Xylos (healthcare products based on biosynthesized cellulose).
  - Medium sized publicly traded companies are fully focused on the biomedical materials market. There focus are can vary between the earlier described specialty biomedical materials such as coatings, implants, drug delivery. In some cases they are also diversified into device and component production.
  - All listed companies have in common that they have high growth expectations and therefore have a high market valuation.
**Important Step in Realizing Ambitions**

- Leading position in the field of biomedical polymers
- Important step in the execution of ambitions in Biomedical Materials:
  - Established presence in market.
  - Objective: by 2012 > €100m sales
  - Broad portfolio products & services for healthcare industry
  - At crossroads of Materials Sciences and Life Sciences

*Accelerating crossover innovation in the heart of DSM’s portfolio*

- DSM aims to establish over €100m in sales by 2012 in the Biomedical Materials market of which PTG will contribute a significant part.

In conclusion, the acquisition of PTG is an important step for DSM in realizing its ambitions in Biomedical Materials, one of the four Emerging Business Areas as defined in its *Vision 2010* strategy. DSM already has a significant presence in this market, using its broad portfolio of competences to develop new products and solutions at the crossroads of Material Sciences and Life Sciences, which address a wide range of healthcare needs. Through the acquisition DSM obtains a leading position in the field of biomedical materials and opens up ample opportunities for further growth.