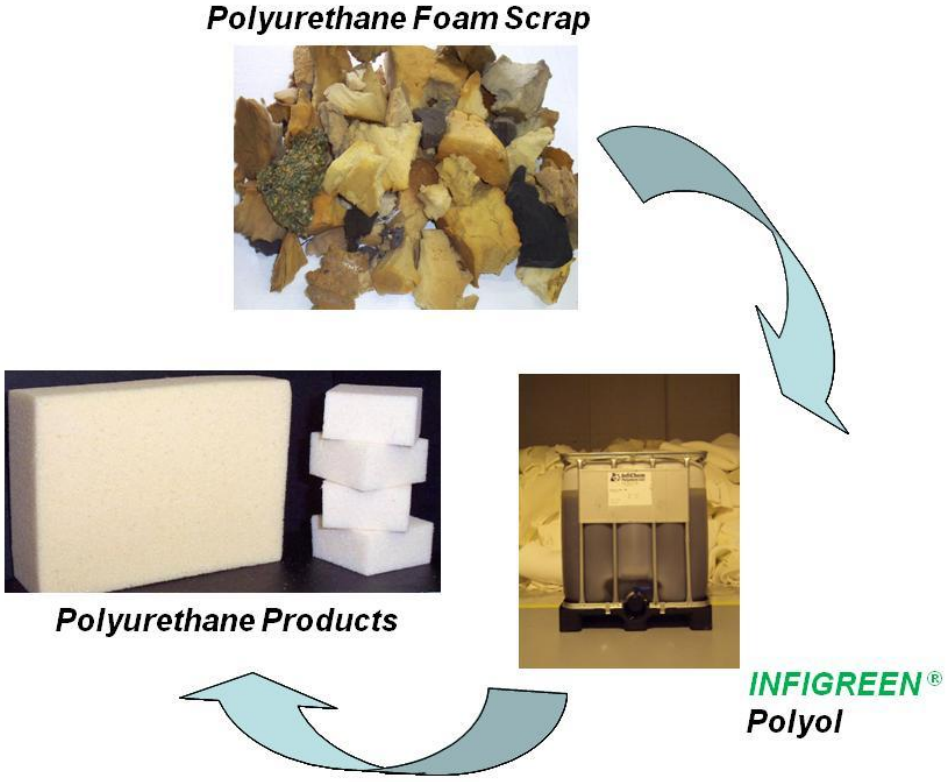
Title of Nomination: InfiGreen Polyols

InfiChem Polymers LLC

INFIGREEN® POLYOLS

RECYCLING THROUGH SCIENCE



Date of Nomination: 12/13/2011

Primary Sponsor: InfiChem Polymers, LLC
President: Dr Ibrahim Sendijarevic
Contact Person:
Gerald R Winslow
Vice President
6430 Nineteen Mile Road
Sterling Heights, Michigan 48314
248-404-7071
gwinslow@infichempolymers.com

Contributors:
USCAR/VRP/American Chemistry Council/DOE-Argonne National Laboratory

Project Title: InfiGreen Polyols

InfiChem Polymers, LLC ("the Company") was formed in 2009 to commercialize its proprietary chemical process for recycling of polyurethane scrap, otherwise destined for landfills, into the InfiGreen™ line of polyol products that are used in production of new polyurethanes. Worldwide, the Company is first to market with this innovative recycling technology.

- Several patent applications have been submitted.
- InfiChem Polymers is eligible for the small business award.
- InfiChem's technology meets the EPA award focus areas of (1) The use of greener synthetic pathways (2) The use of greener conditions and (3) The design of greener chemicals.

The Michigan Company is the first to commercially sell polyols produced from scrap polyurethane foam. InfiGreen™ polyols contain over 60% recycled content, an increasingly important feature in the automotive, construction, furniture, and packaging industries. As a competitively priced, recycled, environmentally friendly material, InfiGreen™ polyols are well received in the marketplace.

The Company has been recognized by various professional and environmental associations and has received several awards, including: 2010 Chrysler's Environmental Achievement Award; 2010 Environmental Innovation Award from the Society of Plastic Engineers; 2010 Environmental Achievement Award from Environmental Management Association; The 2011 Frost & Sullivan North American Enabling Technology Award in Renewable Automotive Plastics and the 2011 Accelerate Michigan Innovation Award for Advanced Materials.

From its demonstration facility, the Company has already implemented closed-loop recycling of polyurethane scrap with Magna International, and the resulting InfiGreen™ polyols are used in production of seat cushions for Jeep Grand Cherokee and Dodge Durango. From this facility, the Company is also supplying InfiGreen™ polyols to customers in the construction industry.

To meet the growing demand for its technology, the Company plans to significantly expand its production capabilities. The projected demand for InfiGreen™ polyols is expected to exceed the current annual capacity of one million pounds (lbs) in the 4th quarter of 2011, and within 5 years the sales of InfiGreen™ polyols is projected to grow to 50 million lbs in NAFTA. Expansion to Europe, Asia, and South America is expected to increase the sales volumes to about 200 million lbs by 2016.

The Problem

In today's sustainability driven world, businesses are seeking to reduce their carbon footprint, improve their "green image," and cut costs. The polyurethane market tried to

meet this need with bio-based polyol materials. The use of bio-based polyols (primarily based on soy) provided reduction in polyurethane carbon footprint.

However, use of bio materials in plastics has significant unintended consequences. Diverting use of land from food to bio-plastics (and biodiesel) can cause food price increases, which raises ethical questions especially in the developing world where significant portion of family income is spent on food. In addition to the ethical issues, the demand for food resulting from increase in population will make use of land for bioplastics cost prohibitive. With recent increase in soy oil prices, the polyurethane industry is already seeing that bio-based polyols are an uneconomical alternative to petroleum based polyols.

In addition, there is a growing problem of what to do with the polyurethane scrap. Significant amounts of polyurethane scrap are generated in production and virtually all post-consumer polyurethane scrap ends up in landfills.

Our Solution

With its recycling technology and InfiGreen™ polyols, the Company is meeting polyurethane market needs for sustainable, green, and economical raw materials. InfiGreen™ polyols are not bio-based and therefore will not divert land use from food.

The Company also transforms polyurethane foams, destined for landfills, into InfiGreen® polyols for reuse in polyurethanes. The process has been demonstrated on a pilot scale with flexible and rigid foam scrap. As such, the Company's technology has potential to divert close to half a billion pounds of polyurethane scrap from landfills. In addition, substitution of 1 lb of conventional petroleum based polyol with InfiGreen™ polyols reduces the carbon footprint by approximately 2 lbs.

For producers of polyurethanes, setting up closed-loop recycling programs with our Company can be very economical. Closed-loop recycling can significantly reduce the landfill costs associated with disposal of polyurethane production scrap. Landfill expenses are on the rise in the United States and are already very high in Canada and the EU. Additionally, closed-loop recycling customers receive InfiGreen™ polyols, which are typically priced below conventional petroleum based and bio-based polyols.

The Target Market

In today's eco-conscious world, most businesses are seeking to reduce their carbon footprint, improve their "green image," and reduce costs. Given the option of neutral cost product alternatives, surveys have shown that customers would choose "green" products 95% of the time. Therefore, to capitalize on this growing trend, InfiGreen™ polyols were developed and are being marketed as a high quality, environmentally friendly, competitively-priced alternative to traditional, petro-based polyols.

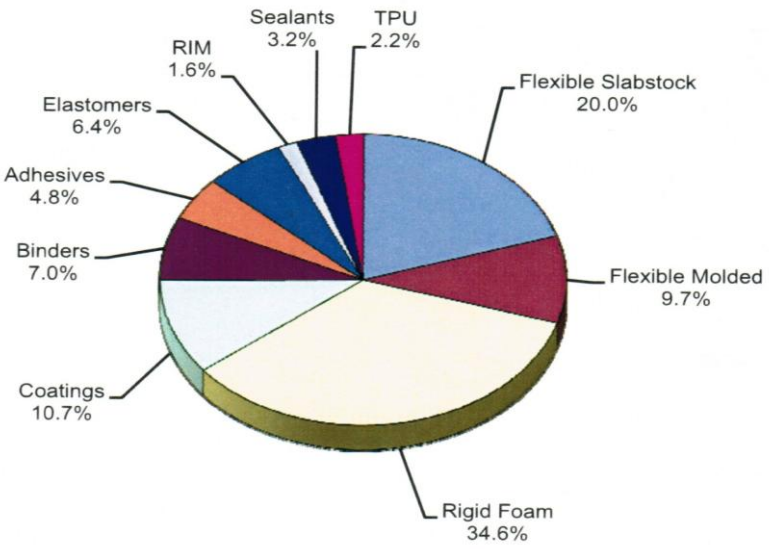
The polyol market is currently estimated at 11 billion lbs, and is projected to grow to 17 billion lbs by 2026. This market has relatively few "Green" options. The Company's main

market base is quite expansive with keen interest for InfiGreen™ polyols in the construction, automotive, furniture, appliance, and packaging industries. The Company is in a unique position to capture this part of the market with its introduction of the first polyols of their kind available on the market.

InfiGreen™ polyols are poised not only to meet the general market need for "green" polyols, but also to meet customers' needs of disposing of their own scrap. For many companies, their manufacturing process creates large amounts of polyurethane scrap of which the companies have to dispose at great bottom line costs. With the Company's unique process, the Company is in a position to engage in closed-loop recycling thus allowing customers to decrease waste, decrease disposal costs, and have their own waste recycled into polyols that the customer can re-integrate into new product.

By 2016, sales of InfiGreen™ polyols are expected to approach 50 million pounds annually in North America. Expansion to Europe, Asia, and South America is expected to increase sales to about 200 million. With polyol sales of 200 million lbs, the Company is expected to capture approximately 1% of the polyol market, with sale potential as great as 5% of the polyol market.

2008 NAFTA PU Production by Product Type
Total Production 6,578.7 Mlbs



Active Customer Base

InfiGreen™ is being used by Magna International, a large, tier-one automotive supplier, in the manufacture of seats for the all-new Jeep Grand Cherokee which launched in May 2010 and Dodge Durango which launched in 2011. InfiChem has set-up closed-loop recycling with Magna, where Magna's production scrap is converted into polyols that are sold back to Magna. Plans are in place with Magna to introduce InfiGreen™ polyols in seat cushions in additional models.

Other major manufacturers of automotive seats are scheduled to incorporate InfiGreen™ polyols in 2012/2013. InfiChem is also evaluating closed-loop recycling of polyurethane automotive headliner scrap with two major manufacturers.

The Company is already supplying polyols to several companies for construction applications and is working on implementing closed-loop recycling in 2012/2013 with one of the largest suppliers of polyurethane panels for commercial roofing.

In addition, the Company is working with major producers of polyurethane foams for furniture and mattress applications to implement closed-loop recycling of their scrap material.

The Company is constantly being contacted from worldwide producers of polyurethanes about the possibility of implementation of closed-loop recycling. The interest level is high in all major polyurethane markets, including automotive, construction, furniture, appliance, and packaging industries.

Key Raw Material – Scrap PUR Foam

With projected world-wide production of 180 million lbs of InfiGreen™ Polyols, the Company will consume/recycle approximately 106 million lbs of polyurethane scrap, which constitutes about 3.5% of automotive molded foam scrap available or approximately 0.03% of all polyurethane produced.

World-wide polyurethane production is approximately 22 billion lbs and at a current growth rate of 3.5% it is expected to reach 36 billion lbs by 2026.

10% of polyurethane produced is flexible molded foam which is primarily used for automotive seating. Flexible molded foam production typically results in 3% scrap rate and after the end of the useful life of vehicles, the molded foam is typically sent to landfills. Currently, it is estimate that 2 billion lbs of automotive seating foam is produced world-wide and is expected to reach 3 billion lbs in 15 years. Eventually, all of the automotive foam will reach landfills. Company's technology can divert this foam from landfills into useful raw material for polyurethanes.

20% of polyurethane products are represented by slabstock resilient and memory foams. Slabstock foam production generates on average 20% scrap rate. Based on 7 billion lbs production capacity in 15 years, approximately 1.4 billion lbs of slabstock foam scrap will be generated world-wide. Company's technology can divert this foam from landfills into useful raw material for polyurethanes.

Manufacturing Process

The scrap foam is liquefied in a reaction with glycol and via propoxylation and/or patent pending chemical steps transposed into various InfiGreen polyols. The figures below schematically represent the overall chemical steps for the manufacturing of InfiGreen™ Polyols.

The process has been demonstrated on pilot scale with seating foam, memory foam scrap from slab-stock, and also with rigid foam scrap. On the pilot plant, the process has been very efficient producing typically less than 1% of waste.

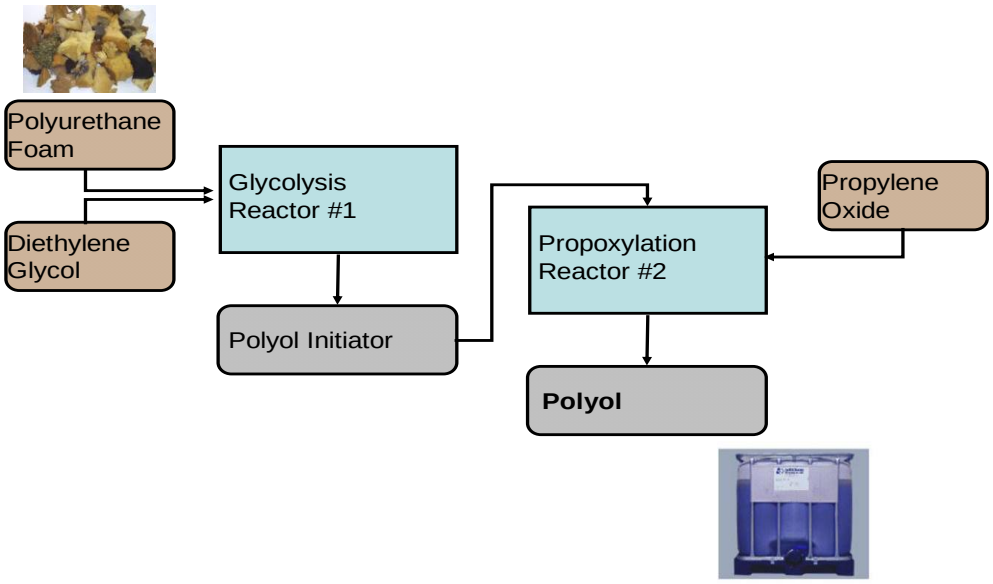


Figure 1. InfiGreen Process Flow Chart

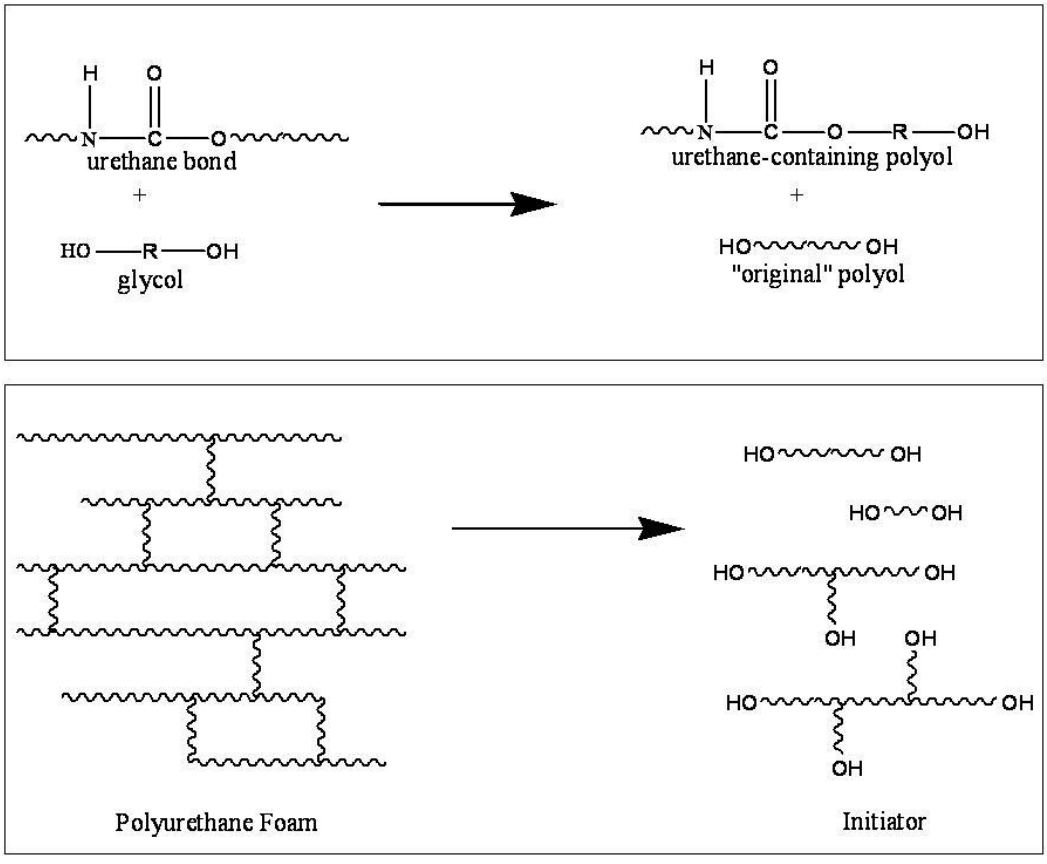


Figure 2. Glycolysis – Chemical Depolymerization

Our Team

Ibrahim Sendijarevic, Ph.D., President. Ibrahim received his Ph.D. from the University of Illinois in 2002. Since then he worked in the pharmaceutical Industry as a chemical engineer where he was involved in the scale-up of active pharmaceutical ingredients. In 2004, he joined Troy Polymers, Inc. as Business Development Director. In this role, he spun off several business ventures based on Troy Polymers technologies, including InfiChem Polymers, LLC.

Vahid Sendijarevic, Ph.D., Vice President of Research & Development Manager. Vahid has over 30 years of academic and industrial experience in the development of polyurethane products, polyurethane raw materials, utilization of polyols in polyurethanes, and is the inventor of the technology for production of polyols from scrap polyurethanes. He is one of the leading experts in the field of polyurethanes, and is president of Troy Polymers, Inc.

Gerald Winslow, Vice President of Marketing. Gerald received a BSME degree from Lawrence Technology and an MSME degree from the University of Southern California. He has over 35 years engineering and management experience working in the aerospace and auto industries. Gerald brings to InfiChem Polymers numerous high level contacts in the automotive OEM's, key automotive suppliers and the chemical industry. Gerald was responsible for securing several of InfiChem's awards, and has secured high levels of interest from major OEMs.

Conclusion

At this time, the Company's "green" competition is renewable energy based polyols. As described in some detail above, for various reasons, these polyols are not a direct competitor to InfiGreen™ polyols. In addition, bio-based polyols have not gained wide acceptance and bring with them their own unique set of application and market acceptance problems.

InfiGreen™ polyols are the first of their kind available on the market, and unlike their competition, they give customers not only a "green" input but allow customers to reduce polyurethane production waste by engaging in a closed-loop recycling process thereby giving customers additional cost savings and additional decreases in their carbon foot print. The Company has proven demand in the market for InfiGreen™ polyols, has set up a closed-loop recycling process with one major customer, and is working on plans to implement the same with additional customers. InfiGreen™ polyols are the first of their kind on the market and in the two years since the Company was formed have gone from concept to a product that is in increasing demand. Not only has the market responded, but the Company has been recognized by awards from various organizations. Demand is increasing and InfiChem Polymers, LLC is poised to take a favorable position in the polymer industry.