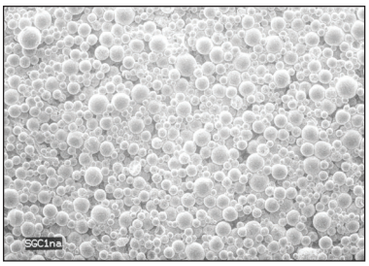
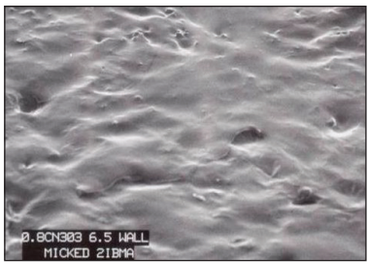
Product Innovation through **MICROENCAPSULATION**

By Ted Goodwin, Vice President of Business Development, Appleton

Pre-applied microencapsulated adhesives are dry to the touch and are non-tacky.





Once the microcapsules are broken, the adhesive is wet to the touch and tacky.

Manufacturers of adhesives and sealants face a challenging search to improve the compatibility of certain ingredients and minimize component poisoning and product degradation. While there are many ways to pursue those goals, one approach that holds unique promise is chemical microencapsulation.

Microencapsulation is the process by which solid or liquid core materials are encased in tiny shells or capsules that are one micron to one hundred microns in diameter. The technology isn't new to adhesives and sealants producers and formulators; you can find microencapsulated ingredients in solvent-based systems, hot-melt systems, single adhesive or sealant material capsules and reactive adhesive or sealant compositions. Microencapsulation technology offers ways to increase customer satisfaction through pre-coating materials with adhesives or sealants that can then be activated at the time and site of the specific application.

Examples include pre-coating screws and fasteners with microencapsulated adhesives, or coating book spines with encapsulated glue that can be activated during the binding process. New antimicrobial compounds and fragrances can be encapsulated and added to sealants and coatings, such as industrial and household paints. Activation could occur during the application process or through planned degradation of the capsule wall.

The appeal of these proven applications for microencapsulation is just a preview of the potential uses for this versatile technology. That potential can best be realized through a collaborative exploration, development and production between a producer or user of core materials who knows and anticipates their customers' needs and a microencapsulator with significant depth and a breadth of technical resources.

One such microencapsulation company is Appleton, an employee-owned company that helped NCR Corp. introduce carbonless paper in 1954. This marked the first commercial application of chemical microencapsulation. Appleton has been producing microcapsules and expanding its knowledge of the technology ever since. The company has also continued to use a flexible business model based on collaboration and open innovation.

A CASE FOR PARTNERSHIP

Appleton calls its collaborative approach to smart chemistry solutions Encapsys™. What makes Appleton's process unique is how the company works closely with its customers to explore and identify benefits.

Encapsys represents Appleton's deep technical resources, craftsmanship and extensive knowledge of microencapsulation. The company's robust infrastructure and technical proficiency support more than a dozen experienced, talented, and creative encapsulation scientists. And Appleton has the capability to do business at a scale that many microcapsule manufacturers cannot. Most manufacturers can produce microcapsules in a beaker; Appleton can make it in tanker quantities, and scale it up quickly.

Encapsys also reflects Appleton's preference for partnering with customers to create product solutions with customer-specified properties. Appleton uses a blend of art and science to tailor capsules to meet the requirements of different end-use applications. Encapsys products and services are customized and based on a rigorous opportunity evaluation process designed to benefit both companies. Appleton is large enough to invest in attractive projects and small enough to operate swiftly and flexibly, leveraging business and technical resources from the inception of a project to its development and launch.

RESULTS-DRIVEN COLLABORATION

As evidence of what can be achieved through technical collaboration with Appleton, give your shirt a sniff. The company worked with Procter & Gamble to co-develop a large-scale use of encapsulated fragrance for Downy® liquid fabric softener. P&G was looking to keep Downy's scent in laundered fabrics longer, thus enhancing the consumer experience and reducing perfume use. Simply adding more perfume would have increased production costs and would not have provided those desired benefits. Microencapsulation seemed an attractive process to consider because of its tremendous benefits.

To push the innovation forward, P&G was willing to collaborate on product development to combine its fragrance expertise and market knowledge with Appleton's microencapsulation know-how. While P&G worked to steer the fragrance to cloth-

Reprinted with permission from *Adhesives & Sealants Industry* magazine, BNP Media, February 2009, www.adhesivesmag.com

ing, Appleton modified its capsule system to endure a series of processes. The end result was an encapsulated fragrance that survives the laundry process and later breaks as clothes are worn to release scent over longer periods of time. The partnership yielded a solution that eliminated waste and added new benefits valued by consumers.

LONG-TERM RELATIONSHIPS

Product innovation is essential to establishing a competitive advantage in any industry, but it can come with a hefty price tag. Appleton's Encapsys process can enable new product ideas and processes, or improve upon existing ones by eliminating a processing step, using less of an expensive ingredient, or incorporating a new ingredient that won't work without the benefits of encapsulation. Companies willing to explore the creative options that microencapsulation can provide may find it can serve as a pipeline for efficient product innovation across multiple product lines. Leveraging the expertise of an industry leader that provides comprehensive experience, resources and the capacity to provide customized solutions will help ensure that a microencapsulation solution is both possible and attractive.

ABOUT THE AUTHOR

Ted E. Goodwin is vice president of business development for Appleton. He has been employed by Appleton for 29 years, progressing through the research and technical organization before creating and leading the company's new business development area in 1999. Mr. Goodwin is a graduate of the University of Detroit, where he earned a bachelor's degree in chemistry. He earned a master's degree in business administration from the University of Wisconsin-Oshkosh. Mr. Goodwin serves on the American Forest and Paper Association/TAPPI Liaison Committee forest & products laboratory, University of Wisconsin-Oshkosh College of Business advisory board, and the board of directors of the Boys & Girls Club of the Fox Valley.

ABOUT APPLETON

Appleton creates product solutions through its development and use of coating formulations, coating applications, and encapsulation technology. The company produces carbonless, thermal, security and performance packaging products. Headquartered in Appleton, WI, Appleton has manufacturing operations in Wisconsin, Ohio, Pennsylvania and Massachusetts, employs approximately 2,400 people, and is 100% employee owned. For more information, visit www.appletonideas.com.

APPLETON