March 11, 2015

Spring 2015 Avant Institute Symposium to highlight innovations in hairstyling and modeling

Renowned experts to discuss latest developments in modeling the protein architecture and morphology of hair types for improved hairstyling formulations

BRIDGEWATER, NJ - Research scientists from academia and the hair care industry regularly conduct hair mapping studies to determine how hair types characterized by differences in protein architecture and overall morphology may behave during treatment and styling with film-forming polymers. Experts in hair mapping and polymer films will present their latest findings during the Avant Institute symposium, *Hair: Innovations in Styling and Modeling*, to be held April 16 in Barcelona, Spain. The results may help advance hairstyling formulations based on hair type.

"Hair types among consumers vary significantly around the world," said Paul Mouser, Ph.D., principal scientist, Ashland Specialty Ingredients. "Advances in hair-modeling studies can bring new information about the distinct behavior of hair. A number of papers about styling functionality will be presented at the Spring Avant Institute Symposium to help explain the differing protein architecture and morphology of human hair and the types of polymers that may better control the behavior of specific hair-fiber assemblies."

Among the scheduled presenters is Manuel Gamez-Garcia, Ph.D., a research fellow at Ashland Specialty Ingredients who has studied how hair has many structural features and properties in common with shape memory polymers (SMPs). Dr. Gamez-Garcia will present experimental and model observations indicating that hair is itself a shape memory biopolymer which, like its polymer counterpart, stores a permanent shape in its crystalline phase and temporary shape primarily in its amorphous phase. The observations may help the hair care industry determine better styling strategies for permanent waving, alkaline straightening and hot iron treatments.

Complexity in the styling process is often attributed to the high degree of diversity in hair types around the world. Morphological differences such as fiber diameter, cross-sectional shape, cuticular conformation, and fiber configuration (including the degree of curl) substantially affect physical behavior and thus the ability to style hair. Whether hair is fine or coarse, straight or curly, each hair type has its own styling process requirements that enable consumers to obtain their desired hairstyles.

Ray Rigoletto, senior manager, global R&D applications, Ashland Specialty Ingredients, has studied extensively how differences in hair morphology affect both single-fiber mechanical properties and hair behavior as a fiber assembly. At the Spring 2015 Avant Institute Symposium, he will present the results of his study that demonstrate the cosmetic effects of hair-fixative polymers and their performance dependence on the nature of polymer-fiber assemblies governed by the morphology of various hair types.

The Avant Institute was established by Ashland (NYSE: ASH) in 2009 to foster and promote scientific research relevant to the development and commercialization of technologies for the personal care industry. Held twice a year, the invitation-only symposium serves as a forum to advance the latest ideas in science and to apply that knowledge in commercialization activities.

Most recently, the Avant Institute convened in Bridgewater, New Jersey, to review the latest discoveries in controlled release and encapsulation. Scientists with expertise in encapsulation design and applied technology presented papers at the Winter 2014 Avant Institute Symposium that revealed how encapsulation will be further utilized in personal care going forward to improve the efficiency of formulations, minimize reliance on actives, or bring multi-functionality to products that historically served a single purpose. Abstracts are available on the web at http://www.ashland.com/avant-winter-2014.

About Ashland Specialty Ingredients
Ashland Specialty Ingredients is the leading global producer of cellulose ethers and a global leader in vinyl pyrrolidones. It offers industry-leading products, technologies and resources for solving formulation and product-performance challenges. Using natural, synthetic and semisynthetic polymers derived from plant and seed extract, cellulose ethers and vinyl pyrrolidones, as well as acrylic and polyurethane-based adhesives, Specialty Ingredients offers comprehensive and innovative solutions for today's demanding consumer and industrial applications. Key customers include: pharmaceutical companies; makers of personal care products, food and beverage companies; manufacturers of paint, coatings and construction materials; packaging and converting companies; and oilfield service companies.

About Ashland
Ashland Inc. (NYSE: ASH) is a global leader in providing specialty chemical solutions to customers in a wide range of consumer

and industrial markets, including architectural coatings, automotive, construction, energy, food and beverage, personal care and pharmaceutical. Through our three commercial units - Ashland Specialty Ingredients, Ashland Performance Materials and Valvoline - we use good chemistry to make great things happen for customers in more than 100 countries. Visit ashland.com to learn more.

FOR FURTHER INFORMATION:

Ashland Contact
Linda Heider
lheider@ashland.com
+33 492 941 606

Media Relations
Thomas Nicolay
Resource Advantage Group
+1 973 882 1313
tnicolay@resourceadvantage.com