Fraser Waldie, NOVA Chemicals

Designing Collation Shrink Films for Achieving Aspirational Sustainability Goal

Historically, low melt index LDPE has been capable of meeting most of the demands of the shrink film market as it provided high absolute shrinkage and reasonable performance. More recently, collation shrink films have increased in popularity for use in display bundling or even as part of the advertising for goods.

Many of these new applications required that the shrink film have improved stiffness and bundling force, superior physical properties, as well as excellent aesthetic properties (haze and gloss) for improving product visibility and/or allowing for high-quality print. In many ways, this shift has been driven from a sustainability perspective whereby thin, lightweight, flexible shrink film offers a highly viable alternative to conventional packaging materials, such as corrugated cardboard, for packaging and collating consumer goods.

Further sustainability drivers now demand the need for downgauging, full recyclability, and even the incorporation of post-consumer recycled (PCR) material. In order to accommodate the diverse performance requirements of today's collation shrink film market, as well as to achieve aspirational sustainability targets, it is essential to understand the key design and evaluation criteria for today's modern shrink film structures.

About Fraser Waldie:

Fraser Waldie is a Technical Service Specialist with a focus on Consumer and Industrial Films and supports a variety of flexible packaging markets, including Collation Shrink and E-Commerce. In his role, he supports customers in bringing new products and applications to market with particular emphasis on developing recycle-ready and sustainable packaging solutions. Fraser been working at NOVA Chemicals for the past eight years, first as a Research Scientist before moving into his current role as a Technical Service Specialist. He was also recently selected as a Rising Star for Plastics News' class of 2021. Fraser graduated with a B.Sc. and M.Sc. in Chemistry from the University of Guelph in Guelph, Ontario.

Larry Effler, The Dow Chemical Company

A Journey to Commercialize Recyclable Flexible Packaging

Major brands and retailers have made various pledges to have recyclable plastic packaging by various target dates. However, most recyclable solutions are not drop in replacements for existing packaging. Also, it's not enough for the package to be reprocessable to be commercially recyclable.

In this talk, we would like to share a case study and describe key technical hurdles that were encountered during a successful development and scale up of a recyclable flexible packaging. Major technical advancements included novel polymer development, flexible film engineering, new coating technologies and packaging line adjustments. In addition to the technical commentary, an end- to-end value chain collaboration will be emphasized as a key ingredient to accelerate innovation.

About Larry Effler:

Larry is currently a Development Scientist for Dow Chemical's Packaging & Specialty Plastics business in Freeport, Texas. He has over 30 years of experience in research and development (R&D) and technical service & development (TS&D) for Dow's elastomers and polyethylene businesses. In his current role Larry supports Dow's end use marketing and sustainability efforts, working with converters, brand owners and retailers to develop innovative and sustainable primary, secondary and tertiary packaging solutions. He is also working with equipment manufacturers, external test labs, universities and organizations such as the Association of Plastic Recyclers and the Sustainable Packaging Coalition in developing more sustainable packaging film applications and test methods.

Larry has a Bachelor's in Mechanical Engineering from General Motors Institute in Flint, Michigan and a M.S. and Ph.D in Polymer Science and Engineering from the University of Tennessee, Knoxville. He is the author of over 20 publications and 13 patents.

Andrea Auchter, Nature Works

Rethinking the Paper Cup – Beginning with Extrusion Process Optimization for Compostability and Recyclability

More than 50 billion disposable paper cups used for cold and hot beverages are sold within the United States each year. Most of the cups are coated with a thin layer of plastic – low density polyethylene (LDPE) – to prevent leaking and staining. While the paper in these cups is both recyclable and compostable, the LDPE coating is neither. In recycling a paper cup, the paper is separated from the plastic lining. The paper is sent to be recycled and the plastic lining, if LDPE, is sent to landfill. In an industrial composting environment, the paper and lining can be composted together if the lining is made from compostable materials. Coating paper cups with a compostable performance material uniquely allows for used cups to be processed by either recycling or composting, thus creating multiple pathways for these products to flow through a circular economy.

A segment of the paper-converting industry uses an extrusion grade of polylactic acid (PLA), frequently for zero-waste venues and for municipalities with local composting and food service items ordinances. The results among these early adopters reveal process inefficiencies that elevate manufacturing costs while increasing scrap and generally lowering output.

NatureWorks and Sung An Machinery (SAM) North America researched the extrusion coating process utilizing the incumbent polymer (LDPE) and PLA. Ingeo™ 1102 is a new, compostable, and bio-based PLA grade designed specifically for the extrusion coating process. The research team identified the optimum process parameters for new, dedicated PLA extrusion coating lines. The team also identified changes to existing LDPE extrusion lines that processors can make today to improve output.

The key finding is that LDPE and PLA are significantly different polymers and that processing them on the same equipment without modification of systems and/or setpoints can be the root cause of inefficiencies. These polymers each have unique processing requirements with inverse responses. Fine tuning existing systems may improve overall output for the biopolymer without capital investment and this study showed an increase in line speed of 130% by making these adjustments. However, the researchers found that highest productivity can be achieved by specifying new systems for PLA. An increase in line speed of more than 180% and a reduction in coat weight to 8.6 µm (10.6 g/m^2 or 6.5 lb / 3000 ft^2) was achieved in this study. These results show that Ingeo 1102 could be used as a paper coating beyond cups.