Flexible Packaging Division Newsletter
SPE ANTEC 2016 edition

May 21, 2016

FLEXIBLE PACKAGING:

STRUCTURE-PROPERTY RELATIONSHIPS & END-USE APPLICATIONS

MONDAY MAY 23, 2016
8:00 AM – 11:00 AM
JW MARRIOTT INDIANAPOLIS
WHITE RIVER C/D

Presentations filled with useful information and innovations for flexible packaging professionals like you.

Looking forward to seeing you in Indianapolis!

Paul Zerfas – Chair, Flexible Packaging Division, SPE

FLEXIBLE PACKAGING

ANTEC Registration:

https://www.eiseverywhere.com/ereg/newreg.php?eventid=127608&

Overall ANTEC Schedule:

https://www.eiseverywhere.com/ehome/127608/362474/

AGENDA

8:00-8:30	1. *Tutorial: Long Chain Branched / High Melt Strength Linear Low Density Polyethylene for Blown and Cast Film Applications* Edward Phillips, Polyolefins Specialist
8:30-9:00	2. *Coating Trials for an Antimicrobial Coating Containing Nisin 2.5% Using Gravure and Flexographic Converting Processes* *Michele Perna, Ph.D. Student, Clemson U. [Bemis]*
9:00-9:30	3. *Predicting the Impact Structure Response of Multilayer Flexible Food Packages Using Explicit Finite Element Models* *Barry Morris, Technical Fellow, DuPont*
9:30-10:00	4. *Capillary Coextrusion: A New Process for Creating Small-scale Coextruded Films* *Patrick Lee, Assistant Professor, U. of Vermont*
10:00-10:30	5. *Case Studies of PP Based OBC for Multilayer Packaging* *Yushan Hu, The Dow Chemical Company*
10:30-11:00	6. *Agility Performance LDPE as a Blend Component in High Throughput and High Bubble Stability Blown Film Applications* *Teresa Karjala, The Dow Chemical Company*

Abstracts

1. *A Tutorial:* The physical properties (puncture and tear resistance) plus higher heat performance of linear low density polyethylene (LLDPE) are highly desirable for many blown and cast film applications. However, being linear in structure, LLDPE lacks the melt strength compared to low density polyethylene (LDPE), which is a result of its long chain, branched structure. Negligible improvements in melt processability are achievable at the reactor stage through short chain branching of copolymers. Often though, it is necessary to blend some LDPE with LLDPE in order to attain suitable bubble stability, blow up ratios, gauge uniformity etc. to achieve necessary application performance requirements. However, film properties and heat performance are sacrificed through the blending technique. This phenomenon is described in detail in the literature by Savargaonkar et.al. from The DOW Chemical Company and in other scholarly publications. Recognizing the need for long chain branched (LCB) or high melt strength (HMS) LLDPE in film and other applications, The DOW Chemical Company has been issued a patent for reactive LLDPE compounds having melt strength of 2-3 times greater than reactor grades. This paper describes a proven technique for obtaining LCB or HMS LLDPE by means of high energy electron beam modification that increases the melt strength of reactor grade LLDPE by 5-7 times without secondary compounding and without creating gels. These materials can be used as stand-alone film grades or as melt strength modifiers for conventional LLDPE and other polyolefins
2. Nisin is a GRAS (generally recognized as safe) approved antimicrobial peptide that has been found to be effective against Gram positive microorganisms. Implementation of nisin into antimicrobial packaging has the potential to extend product shelf life through inhibition of spoilage microorganisms. This study found that it is possible to

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produce an antimicrobial coated material using large scale production processes such as gravure and flexography. The coated material produced using flexography resulted in material with potential to be sealed and did not delaminate like that of the material produced during the gravure trial. Both trials produced materials that maintained antimicrobial efficacy against *M. luteus* when control films were compared to treatment films. (P>0.0001)

3. In previously presented work (ANTEC 2015), the authors developed a laboratory test method capable of ranking the impact puncture resistance (IPR) of multilayer flexible packages. This paper describes the development of nonlinear finite element models capable of predicting the IPR of the same multilayer structures. Information about the method used to obtain material properties at relevant strain rates, and comparisons between predicted and experimental responses are presented.
4. Coextrusion is an important method for making barrier and optical products at large scale. In these multilayer polymer films, adhesion is critical for performance, yet is difficult to predict by small scale experiments. Past work has shown vast differences between bilayers produced in coextrusion (continuous process) versus lamination (batch, quiescent process). In this work, a small scale coextruder die is designed and attached to a dual-bore capillary rheometer. Model films are quickly produced for adhesion testing, with adhesion showing a strong dependence on residence time.
5. Dow has developed a new family of polypropylene (PP) based olefin block copolymers (OBCs). This novel family of block copolymers offers break-through system performance when used as a component in multilayer structures for combining PP and polyethylene (PE), or combining PP with polar polymers. These multilayer systems offer customers unique combinations of properties such as exceptional adhesion, temperature resistance, durability and film design flexibility. The current paper discusses film structures and property enhancement when the PP OBC is used for retort tie layer application and as a versatile sealant films.
6. Blends of LLDPE (linear low density polyethylene) and LDPE (low density polyethylene) are used in many film applications. This paper shows how several AGILITYTM Performance LDPE resins can be used as a blending component to increase output or throughput on blown film lines. In addition, some of these LDPE resins are utilized in shrink films, providing a good combination of shrink and optics, and are also used in foams and extrusion coating among other applications

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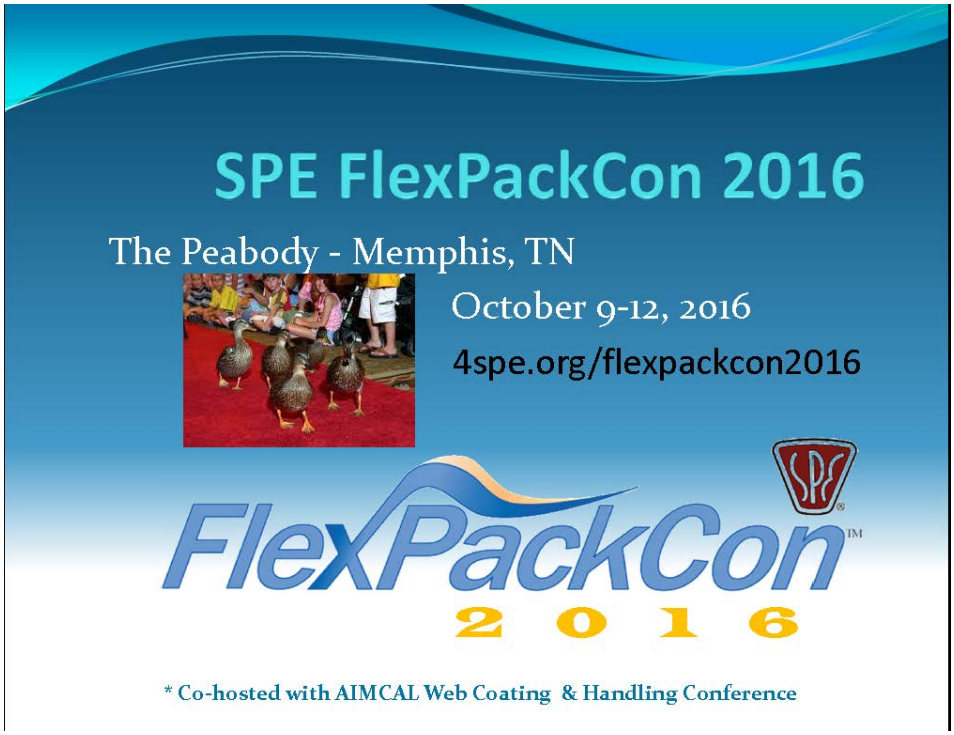

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