

Conference Program at a glance

Day 2 Thursday, May 13, 2022

in-adhesives

Symposium on Innovations in
Adhesives and their Applications

09:00 - 09:25

Dr. Berns Belinda

Subject Matter Expert Optical Bonding



OPTICAL BONDING - A WHOLE NEW INDUSTRY - COMPLEX AND HIGHLY DEMANDING

Abstract:

This presentation is addressing one of the most common, but also most invisible bonding applications nowadays. Optical Bonding brings significant benefits to all kinds of display stack systems, from consumer electronics, industrial & appliance, medical, aerospace, advertising industry, military and automotive multimedia systems for performance enhancement (optical) but also for long lifetime stability (protection function). Every company would like to benefit from optical bonding technology, but many have underestimated this highly diverse and complex adhesives & applications area and have given up. The strongest and experienced ones established well in the market. This invisible technology requires understanding of the full stack with all components and possible interactions. Not comparable to “just a simple bonding”.

Today at in-Adhesives conference you will receive an insight into the different chemistries from acrylic to silicone. As well as different application and bonding processes.

This technology is not brand new and the synonym optical bonding is well known. Meanwhile it has established a whole new industry sector. Back in October 2013 attendees of the MKVS (Munich Adhesives and Finishing Symposium) could gain a very first insight already from me with an adhesives manufacturer perspective. As we know industry never is pausing, it is always developing further in terms of technologies and demands from industries and designs. For almost six years now I am working at an end user and would like to share some of my knowledge with you.

09:25 - 10:00

Loparex and Wacker Chemie

Ian Grace and Dr. Thomas Gröer



THE FUTURE IS COLLABORATION - RELEASE LINERS AND HIGH-PERFORMANCE MEDICAL SILICONE ADHESIVES

Abstract Loparex

Release Liner choice is most often the very last part of any product design, and rightly so. It is not possible to select the correct Release Liner until the Adhesive & Process have been defined.

Selecting the correct Release Liner for a Health Care application can bring added complexity, especially when it involves compatibility with the latest generation of Silicone PSA's. Knowing how a Pressure Sensitive Adhesive performs with a specific Release Liner can reduce development time and consequently, time to market.

With the development of new Silicone PSA systems, the need for collaboration with the Adhesive producer has never been more relevant. We would like to present to you the basics of Release Technology, the special requirements for Silicone PSA's and some market demands that have led to a unique collaboration.

Abstract Wacker:

Advanced wound care, as many other applications in the medical field, where reliable yet sensitive adhesion and painless removal of wound dressings or tapes are imperative, have generated an increasingly strong demand on the adhesive properties of silicone medical gels.

Increasing adhesion does also go together with the necessity for release liners, which assure protection of the adhesives layer as well as an easy and stainless release. Be it in-process or for the final good.

We present the results of a unique collaboration, showing release force measurements and long-term studies on the suitability of commonly used groups of liner materials with high-performance medical silicone adhesives.

10:00 - 10:25

Dynasol Group

Jesus Eduardo Ibarra



NEW SEBS FOR HOT MELT ADHESIVES WITH LOW MELT VISCOSITY FOR INDUSTRIAL AND MEDICAL APPLICATIONS

Abstract

The incursion of SEBS hydrogenated copolymers in the adhesive market, until now has marked a trend in the market segments of sealants or translucent labels, this due to its excellent resistance to UV light, to the effects of the environment and its good resistance ozone and high temperature.

New SEBS hydrogenated copolymers have been developed, with the ability to give the Hot Melt adhesive an excellent low temperature processability, maintaining stability in adhesion properties at low temperature ($\approx -5^{\circ}\text{C}$) and at temperatures above room temperature ($\approx 60^{\circ}\text{C}$); allowing the adhesive to obtain low peeling strength for applications where it is imperative not to leave a residue on the substrate or not damage it, when the label, tape or film is removed, as is the case with labels or tapes for medical use with direct or indirect contact with the skin, as well as the protective paint films that are placed on new vehicles.

The design and structure of these SEBS make them feasible to be formulated with hydrogenated hydrocarbon resins, which by their nature have no color or odor, this being one of the main requirements in adhesives, with special applications that are in direct or indirectly contact with the skin, food or medicine.

The objective of this work is to show to adhesives market the feasibility of using these new SEBS with their operational and performance advantages.

10:25 - 11:00

REFRESHMENT BREAK

11:00 - 11:25

Bostik

Arnau Pejoan



NEW n-BUTYL CYANOACRYLATE BASED ADHESIVE TO COMBINE FLEXIBILITY, HUMIDITY RESISTANCE AND LOW CLP

Abstract:

Cyanoacrylate adhesives are massively used for quick assembly and repair applications, but they are rarely used for applications that require long term performance as they might have limited durability in tough environments.

Bostik has developed a new bi-component (2K) adhesive under Born2Bond™ brand that enable users to free themselves from those limitations.

The idea that drove this development is to get the benefits of instant adhesive in applications requiring at the same time a good humidity resistance and robust mechanical properties. Typically, it becomes now possible to get instant bonding on objects that will be used in wet environments and will not brake when falling.

One of the innovations that made these results possible is the use of n-Butyl cyanoacrylate (BuCa). We will present how this a hydrophobic monomer was formulated into an adhesive with significant plasticity ($>100\%$ elongation), good resistance to drop test, combined with a unique resistance to high humidity conditions ($85^{\circ}\text{C} / 85\% \text{RH}$).

BuCA monomer has no CLP label and is well known as the main component of many instant medical grade adhesives. However, until today its use in the industry markets was limited and barely used blended with other cyanoacrylate monomers in adhesive formulations. Though this monomer is becoming more readily available with companies like CMC proposing differentiated cyanoacrylates monomers at the industrial

This novel adhesive is designed to meet market needs in terms of Productivity (fast clamping, high performance in short period of time, bonding efficiency, automatic dispensing), Quality (precise dispensing, reliability) and Sustainability (low odor, low blooming, low CLP).

11:25 - 11:50

Fraunhofer-Institute for Structural Durability and System Reliability LBF

Julia Decker



DESIGN OF HYBRID ADHESIVE JOINTS UNDER THERMAL AND FATIGUE LOADING

Abstract

When it comes to lightweight design, hybrid adhesive joints of metal and composite parts offer several advantages regarding lightweight and load transmission compared to conventional mechanical joints. However, the reliable application of hybrid adhesive joints under significant thermal and fatigue loading faces several challenges such as the different thermal expansion of the adherents and the degradation of adhesive properties under high temperatures, due to their polymeric nature. In the current BMBF project "GOHybrid", design solutions are investigated to meet these challenges. The project focuses on a hybrid automotive wheel application, in which an aluminum wheel center is adhesively bonded to a composite rim well. The joint must endure significant fatigue loading during the 360° roll procedure at different load cases, as well as thermal loading due to the high temperatures of the breaks. This work presents the current state of the project, including the characterization of the adhesive under different temperatures and multi-axial loading, as well as the approach to developing an adhesive joint design, highlighting different design challenges.

11:50 - 12:15

Drei Bond

Dr. Florian Menk



BONDING OF GRAPHITIC BIPOLAR PLATES FOR HYDROGEN FUEL CELLS - FROM ADHESIVE DEVELOPMENT TO HIGH SCALE AUTOMATED APPLICATION

Abstract:

Nowadays more than ever before, rethinking the energy supply has become a focus topic. On the way to independency of fossil fuels and reduction of anthropogenic climate change to an acceptable level, the development of new, sustainable energy sources is an absolute key factor. Hydrogen fuel cells (FCs) present one feasible technology which is very promising both for mobile as well as stationary applications. FCs consist of several components of which the bipolar plates (BPPs) are one of the core elements (e. g. in terms of efficiency and lifetime). For applications such as small vehicles/passenger cars, the demands often qualify metallic BPPs as best solution. However, state of the art metallic BPPs enable operating hours of 5,000 to 8,000 which is not sufficient for applications such as commercial vehicles or stationary power systems. Today, the demands of such applications (20,000 to 40,000 operating hours) can only be met by graphitic BPPs. One of the main disadvantages of graphitic BPPs is the, so far, significantly slower production rate compared to metallic BPPs. In this context, Drei Bond has developed a new adhesive which fulfills the high demands defined by the customer (e. g. chemical resistance and curing time) and, additionally, engineered a small-scale automated application system for prototyping. Combining the strengths of Drei Bond – a deep understanding of the adhesives' properties as well as years of experience in the field of automated dispensing – we are currently developing a very fast dispensing system to enable higher production rates.

12:15 - 13:45

LUNCH

13:45 - 14:10

Schill+Seilacher "Struktol"

Sven Wiemer



FLAME RETARDANCY – CONCEPTS NOT ONLY FOR COMPOSITES

Abstract:

Flame retardancy is already an integral part of many applications in the transportation sector, such as aviation, rail and marine. Primarily, requirements are placed on composite components or coatings, which must meet the relevant standards. The only sector that has just "discovered" flame retardant systems are the OEMs, i.e. vehicle manufacturers for passenger cars. The driving force behind this is the increasing demand for electromobility and the associated changing requirements for vehicle concepts. But especially in the protection of the now necessary batteries, whether for PHVs or EVs. The requirement is on the hand to nip thermal runaways from individual battery cells in the bud, so that neighboring cells do not also become thermal runaways. On

the other hand to equip the battery housing with flame retardants, especially in the direction to the passenger cell, in order to give the occupants sufficient time to get out of the vehicle in an emergency.

There are different concepts for this: In the first case, the so-called gap fillers, which embed/ encapsulate the individual battery cells, can be made flame-retardant. In the second case, the aim is to make battery housings flame-retardant with a fiber composite component.

In both cases, however, the basis for integrating reactive, chemically active flame-retardant systems is the same. In the following, system based on organophosphorus compound DOPO will be presented, as they have been successfully used for years, but also new areas can always be developed. A possible further transfer from composites to adhesives is therefore obvious, since the battery enclosures also have to be joined and sealed by means of adhesives.

14:10 – 14:35

nolax

Dr. Heiko Jung



ROOM TEMPERATURE, FAST CURING TWO-COMPONENT POLYUREA ADHESIVES FOR HIGHLY ELASTIC STRUCTURAL BONDED JOINTS IN E-MOBILITY

Abstract

Electrification in the automotive industry requires fundamentally new components and joining processes - especially for batteries and their thermal management systems, where multi-material parts are bonded to structural and crash-relevant elements. For these applications, the nolax start-up Fastener has developed a two-component polyurea adhesive technology that enables curing within seconds, thus allowing rapid processing. Our latest generation of polyurea adhesive combines ultra-high curing speed with structural bonding performance and the highest elasticity.

Adhesives based on polyurea are two-component reactive systems. Component A contains bifunctional isocyanates of monomeric and prepolymer nature. Component B contains bi- and multifunctional amines. Polyureas are formed at ultra-fast crosslinking speeds even at room temperature as compared to polyurethanes. This is based on the amine's much stronger nucleophilic character, especially aliphatic amines, as against alcohol in the polyurethane reaction. The ultra-fast curing time allows immediate handling and subsequent converting of the bonded substrate after applying the adhesive. In this way, the short cycle times and the absence of additional energy input provide cost-effective productions.

With a specific example from our latest development, we want to show the properties and performance of highly elastic and fast curing two-component polyurea adhesive in multi-material bonding in e-mobility.

14:35 – 15:00

Substratec

Andreas Reisenzahn



SUBSTRATEC.COM – SEARCH ENGINE FOR ADHESIVE BONDING TECHNOLOGIES

Abstract

Can adhesives projects be supported with digital technology? Opinions vary greatly on this question, but there is no doubt that digitalization is finding its way into the adhesives industry. The only question is in which areas and to which extent. Digital technology can help long before the actual bonding process begins. Which materials need to be bonded? Are there any requirements for the processing technology? Which requirements will the bonding layer have after curing and which legal standards or certifications may restrict the usability of certain systems? Substratec.com has helped process managers find the right bonding technique since 2016 by providing a platform to run through a variety of bonding scenarios. Our navigator uses multiple databanks to map out the various technical parameters for individual bonding cases.

The new search areas we have added, including chemical and mechanical pretreatment of substrates as well as metering and processing technology, allow the user to navigate the whole world of adhesives. In addition to the purely technical filter options, there is now a separate area, opened at the beginning of 2021, that enables searches for adhesives based on practical bonding applications. This area offers detailed examples of how adhesives can be applied in both the manufacturing industry as well as the construction and craft sectors. The search results show comparisons of and make suggestions for products and

technologies in a manufacturer-neutral ranking. The search mechanisms use technical data provided exclusively by manufacturers and suppliers. Once the favored product is selected, the user receives the respective technical product information as well as contact options for the corresponding suppliers. At the end of 2021, Substratec GmbH has introduced a new navigator world for additive manufacturing processes alongside the search engine for bonding technologies, thus laying the foundation for the connection of two innovation-driven industries whose technical synergy potential is beyond question. Further search areas for coatings, paints, and varnishes as well as oils and greases have been added already. The B2B platform provides a quick market overview and enables practice-oriented preliminary research that facilitates uncomplicated, direct access to technical expertise.

15:00 **FAREWELL**
