

SMART POLYURETHANE PRESSURE-SENSITIVE ADHESIVE WITH CONTROLLED TACK

DESCRIPTION OF THE TECHNOLOGY

The University of Alicante has developed an innovative polyurethane pressure sensitive adhesive (PSA), that presents a controllable degree of stickiness ("tack") with respect to the current adhesives. The tack of the adhesive is changed abruptly in specific short ranges of temperature.

The adhesive is synthesized by the reaction of isocyanates and polyols, and by controlling the synthesis a good balance between tack, adhesion and cohesion can be achieved.

MARKET APPLICATION SECTORS

The adhesive is potentially biocompatible and has excellent properties for use in medical applications (dressings, bandages, ...). Applying a slight temperature variation, the adhesive can be easily removed, without generating waste or causing discomfort to the patient.

It can also be used in other applications such as labeling for the transport of goods or refrigerated food. This technology makes it possible to define optimum tack in very specific short temperature range, outside of which adhesive tack is considerably reduced. Good label condition can be a good indicator that the package has maintained the preset temperature conditions over time.

As an example, several formulations have been optimized for specific applications in the following temperature ranges:

- Between 10°C and 39°C, focusing on an optimal point of adhesion at 37°C. At temperatures below 25° its adhesion capacity drops considerably. This adhesive is ideal for use in medical and skin contact applications.
- Between 5°C and 20°C. This adhesive is ideal for special applications such as labelling for the transport of goods at room temperature (fresh food, beverages, etc.).
- Between -10°C and 5°C. This adhesive also focuses on specific applications such as labelling for the transport of refrigerated goods.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The adhesive developed by the researchers of the university is a pressure sensitive adhesive (PSA) based on polyurethane without the need of adding tackifier, so it has the usual advantages of these adhesives that provide them with excellent conditions for medical use.

In addition, polyurethane PSA incorporates a series of advantages that provide unique features such as the following:

- It presents a permanent stickiness when applying a light pressure with the fingers. It does not require activation for its application, it maintains the joint to the substrate in time and leaves no residue upon removal.
- Polyurethane PSA adhesives are more hydrophilic and biocompatible than other PSA adhesives.
- The developed adhesive shows a good skin tolerance.
- The new formulation has managed to solve the main drawbacks of the polyurethane PSA, i.e., its low tack at room temperature, obtaining optimum adhesion properties, without sacrificing its cohesion.
- The adhesion of the new polyurethane PSA adhesives can be modified in a wide range of values by changing their segmented structure, and the adhesives are completely transparent.



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- By varying the synthesis process, the tack can be controlled on demand by customizing the temperature ranges in which the adhesive is active.
- Adhesion can be easily removed by slight variation of the temperature.

CURRENT STATE OF DEVELOPMENT

The production process has been carried out satisfactorily at laboratory level where the combination of its components and the synthesis processes have been optimised.

Different adhesives have been developed that operate satisfactorily in various temperature ranges. These adhesives have been characterized and their applicability has been validated in different uses such as biomedical or low temperature conditions.

INTELLECTUAL PROPERTY RIGHTS

This technology is protected by patent:

- Title of the patent: "Adhesivos termoplásticos de poliuretano sensibles a la presión (PSA) con pegajosidad controlada en un corto rango de temperaturas".
- Application number: P201731444 - Application date: 20/12/2017

COLABORATION SOUGHT

Researchers are looking for partners to negotiate patent licensing agreements, as well as to develop R&D projects to look for new applications for adhesives.

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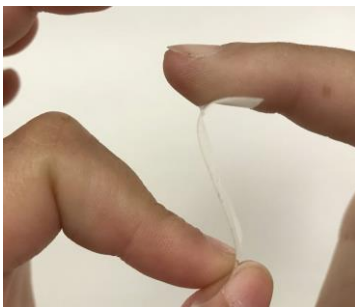


Image 1: Example of adhesive developed

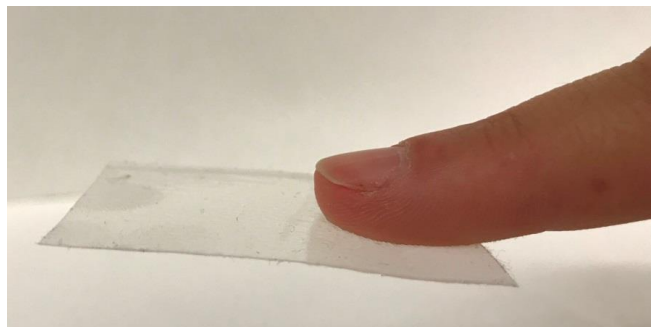


Image 2: Example of adhesive developed

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