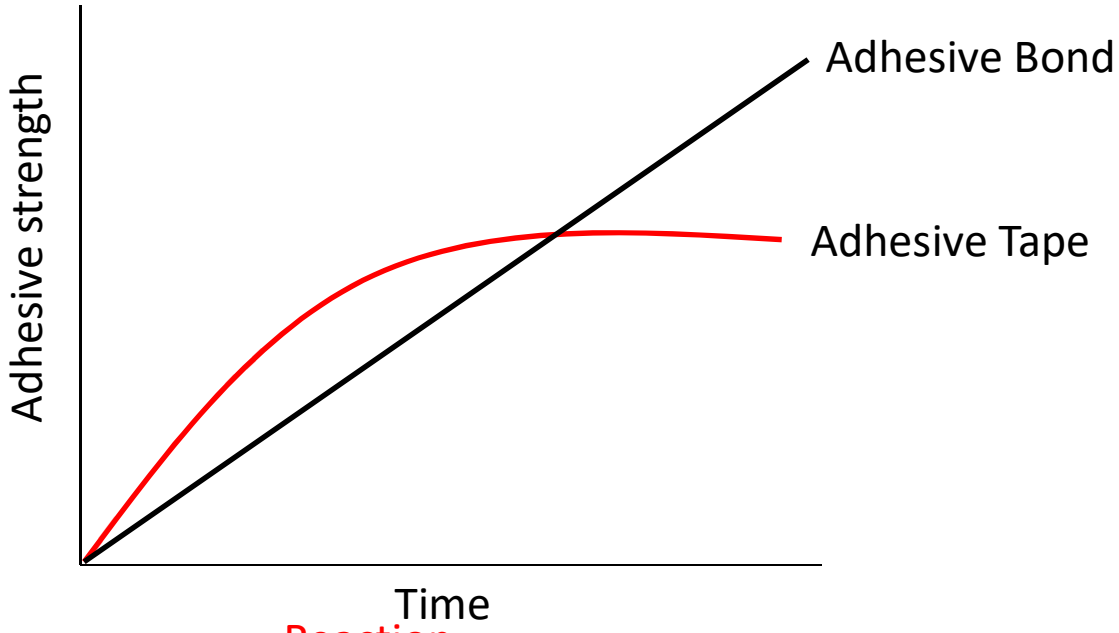
Difference between Adhesive Tape and Adhesive Bond

■ Definition of adhesion

A type of adhesion bond, bonding by applying a slight time and slight pressure at room temperature without using water, solvents and heat.

■ Difference between adhesive tape and adhesive bond



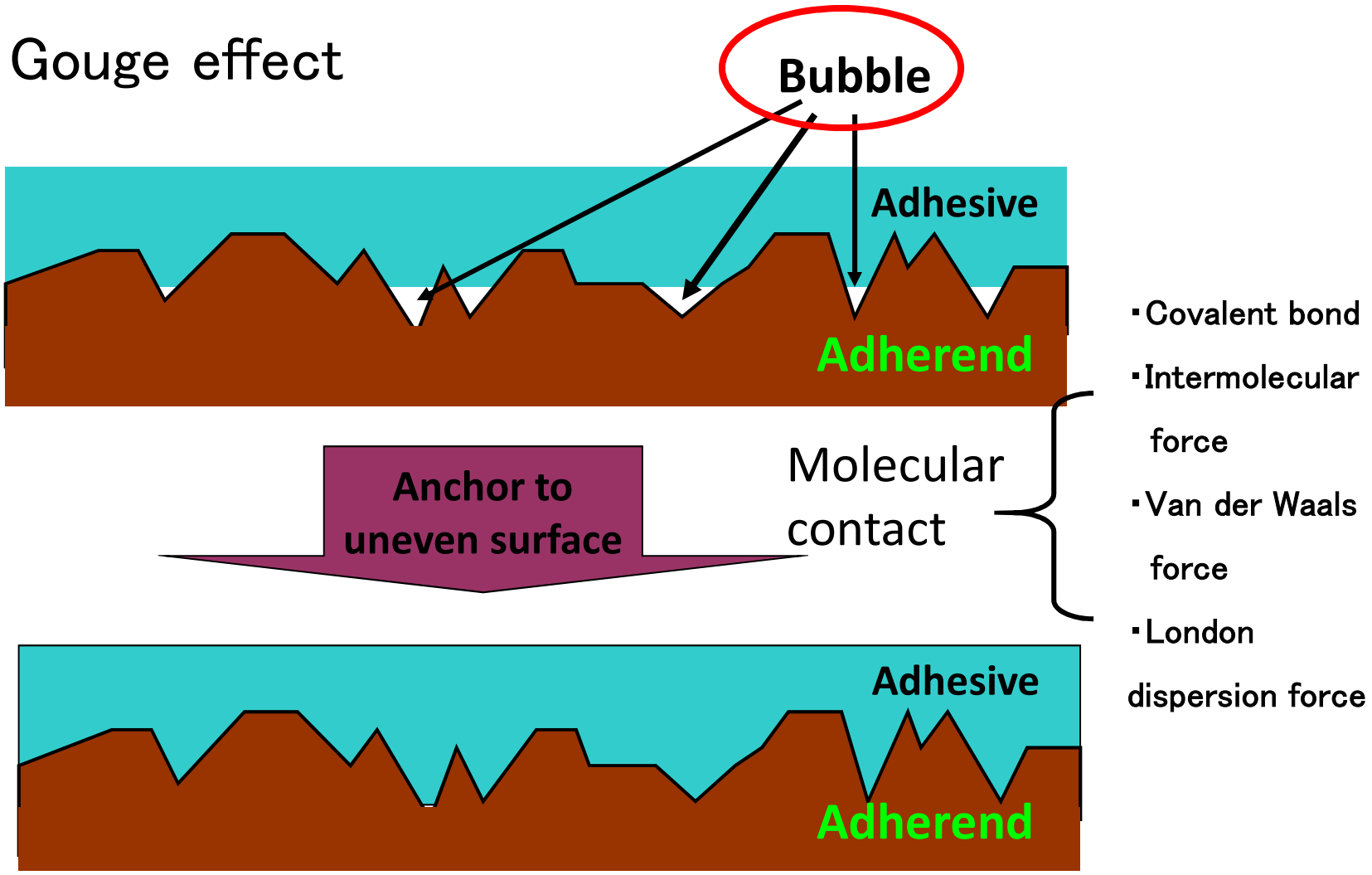
◎Adhesive Bond : Liquid —Reaction→ Solid

▶ Since the adhesive requires time for curing, the degree of progress of the reaction depends on the adhesive force.

◎Adhesive Tape : Liquid ⟶ Liquid

▶ The adhesive has completed the reaction and has high adhesion in a short time.

Mechanism of adhesion



Mechanism of Adhesive Bond

What is adhesive bond?

Adhering two solid surfaces to each other via a third medium

① Mechanical bond (anchor effect)

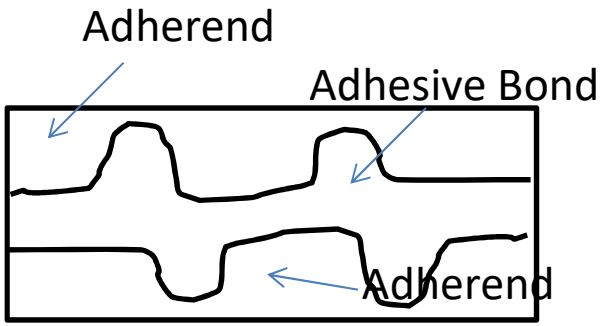
It flows into a small hole in the adherend. Cure / bond as if tied holes

② Chemical bond (primary bond, intermolecular force)

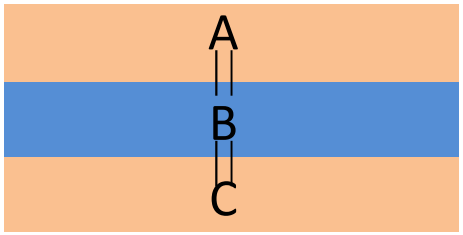
A state in which two adherends are bound by a chemical action.

③ Physical adhesion (secondary bond / intermolecular force)

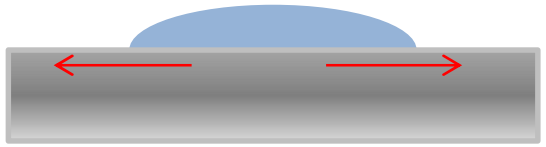
Wetting spread characteristics (wettability). Adhesion by adhesion between molecules



Mechanical adhesion



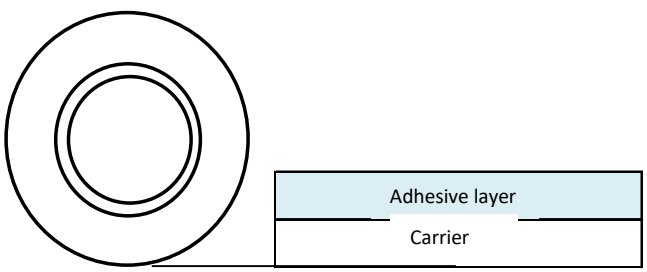
Chemical adhesion



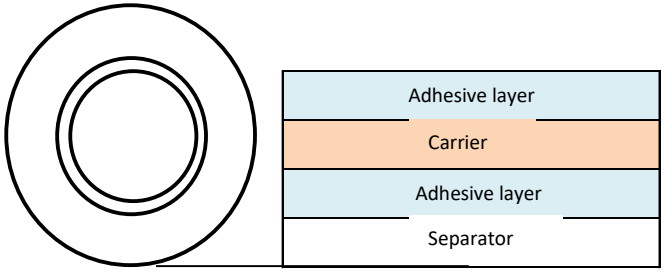
Physical adhesion

Foundation of adhesive tape

■Form of adhesive tape



Single-sided tape



Double-sided tape

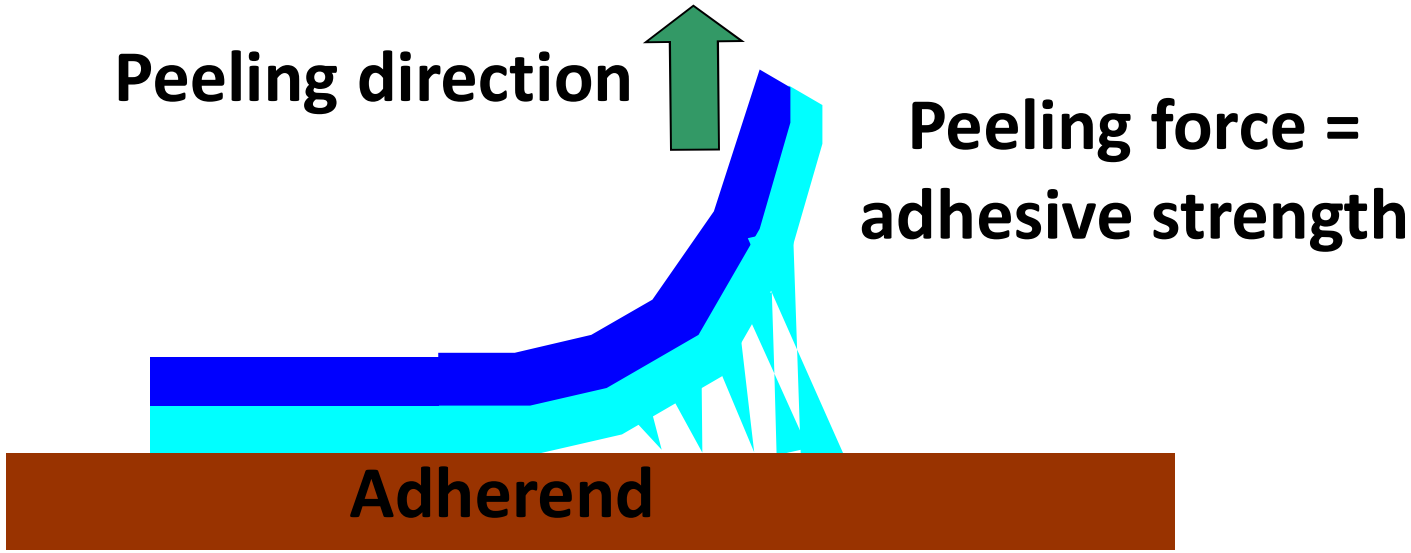
Adhesive processing is performed on one side or both sides of the carrier for production of adhesive tape.

➢ Many materials such as nonwoven fabric, foam, metal foil and film are used for the carrier.

Peeling phenomenon

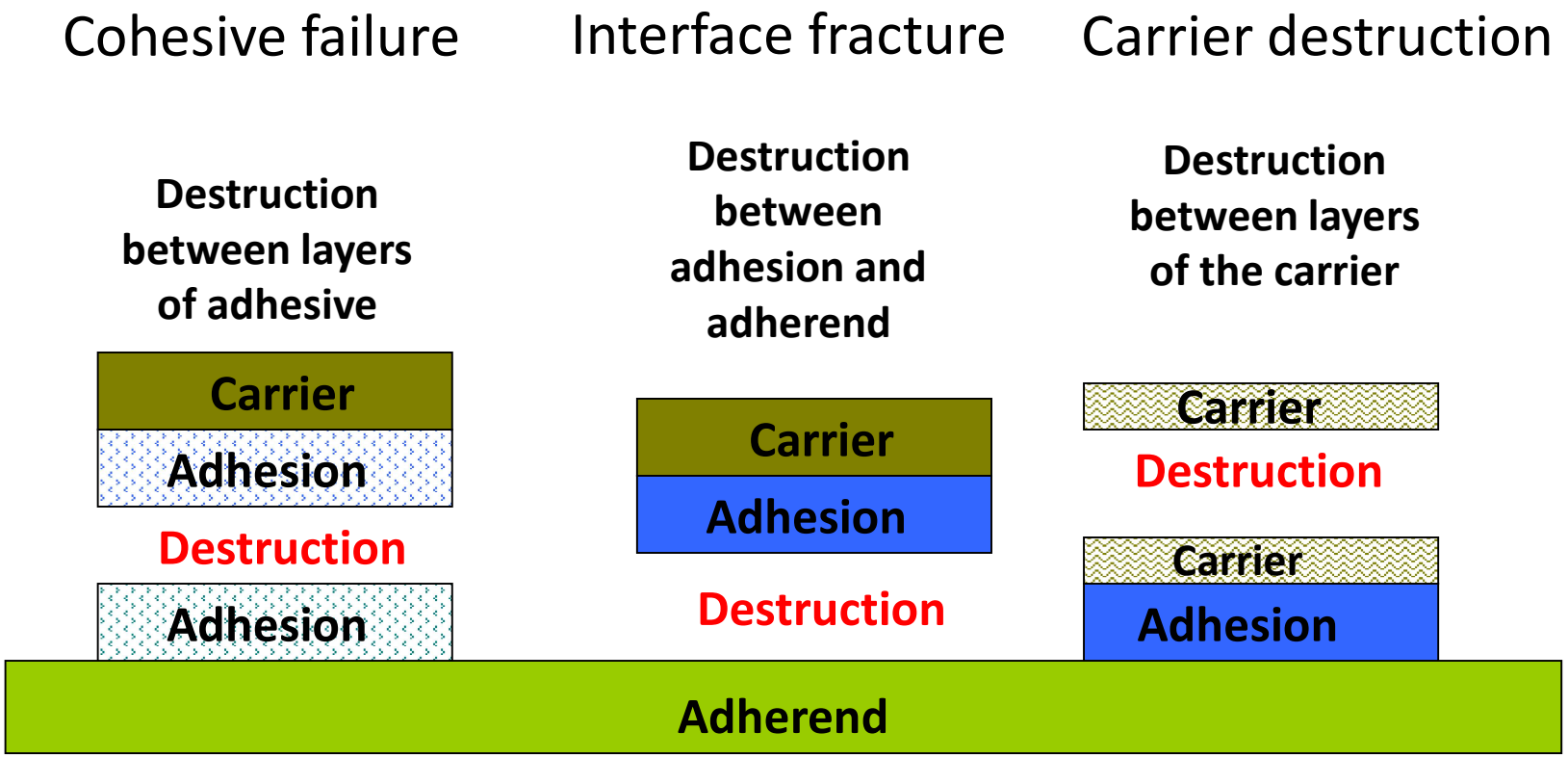
The adhesive tape material can be peeled off.

The peeling phenomenon changes depending on the peel angle and speed.

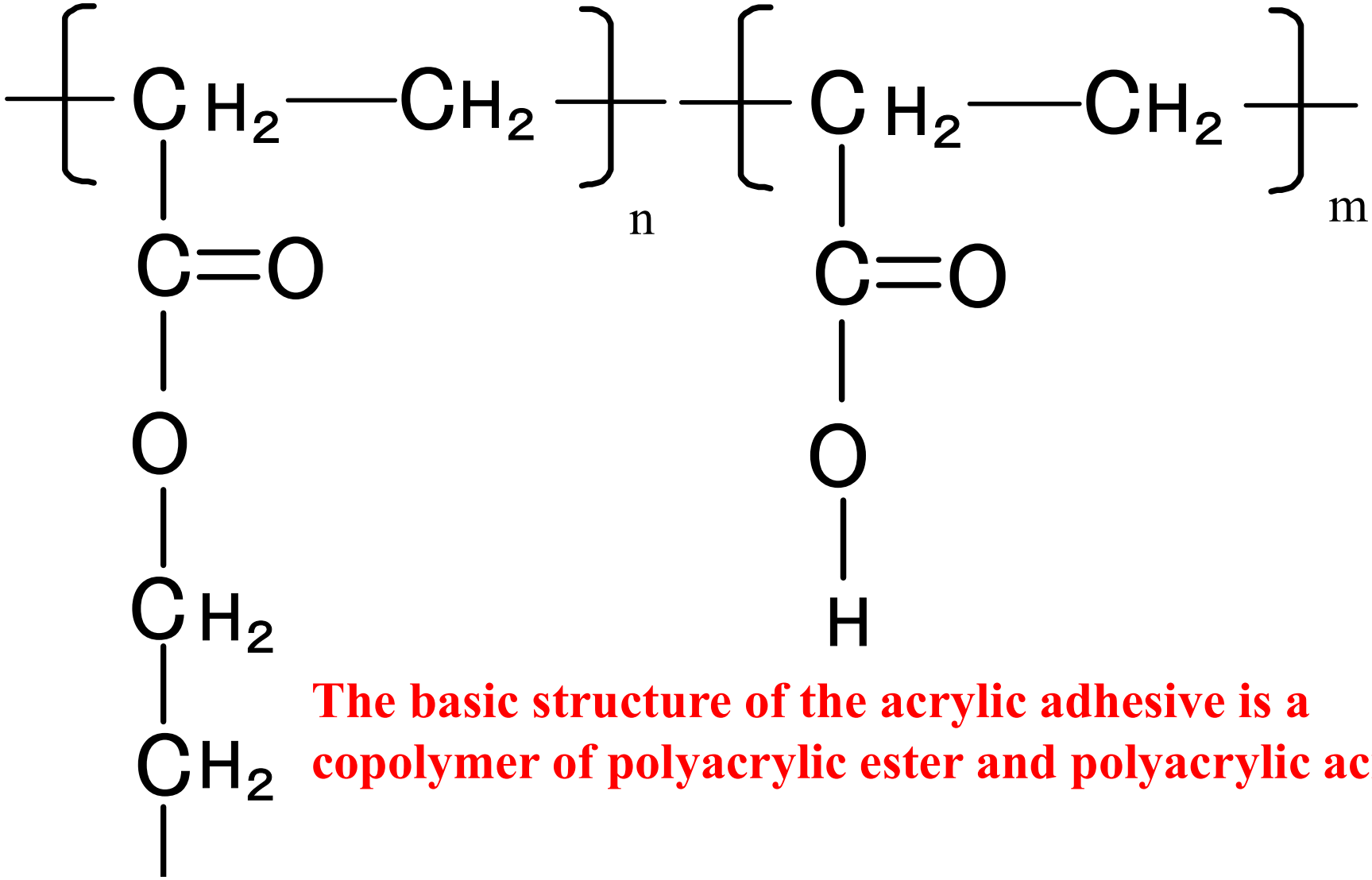


Peeling force = elasticity of carrier + elasticity of adhesion

Classification of peeling

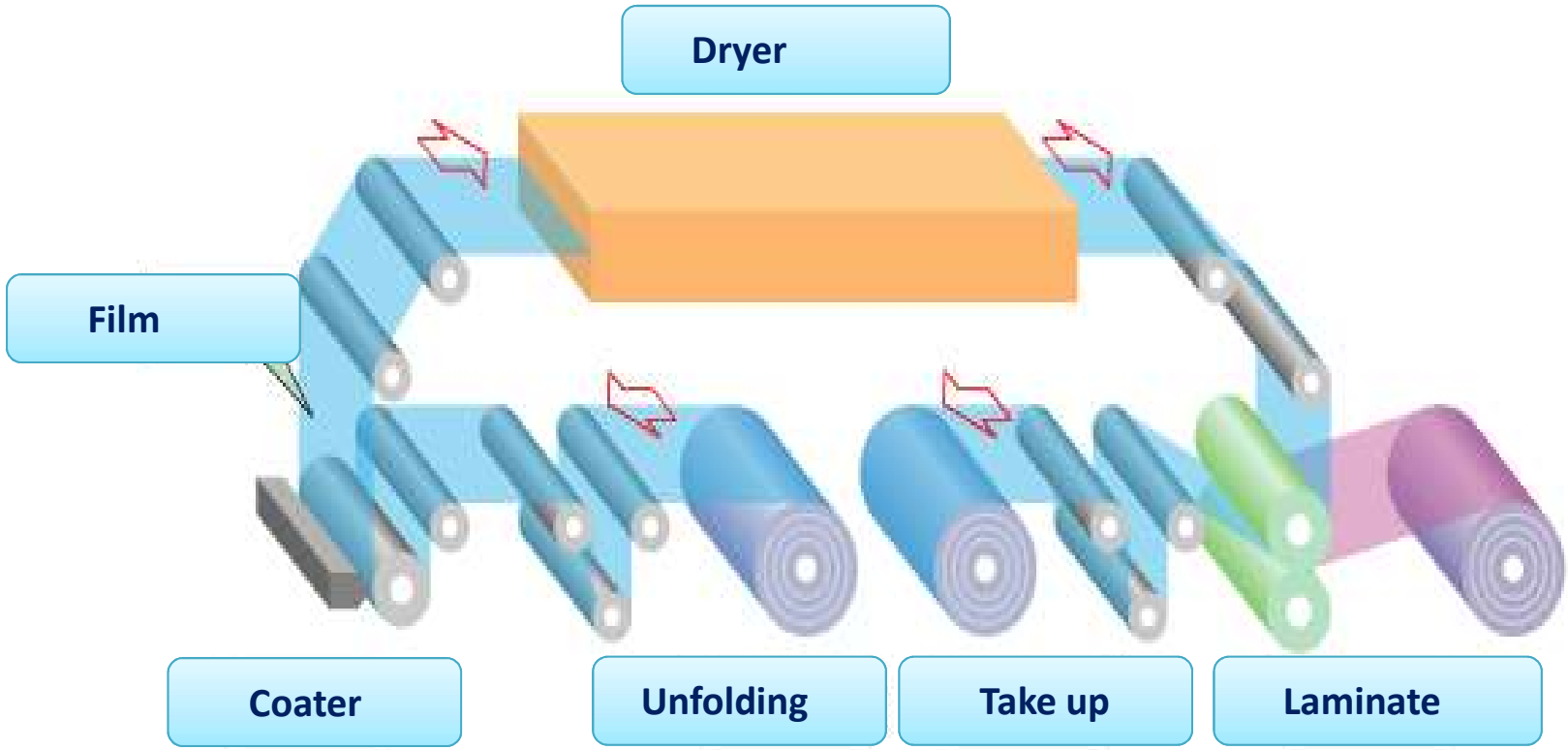


Basic structure of adhesive tape



The basic structure of the acrylic adhesive is a copolymer of polyacrylic ester and polyacrylic acid

Manufacturing method of adhesive tape



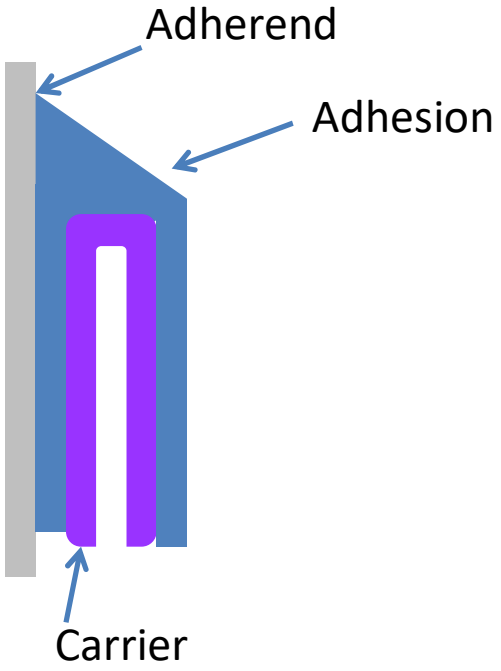
Adhesive processing equipment

Basic physical properties of adhesion

■ Three physical properties of adhesion

1. Adhesive peel force

Adhesion is defined as "the force generated by the contact between the adhesive surface of the adhesive tape and the adherend". It means "the force required when peeling off stuck objects".



Measurement

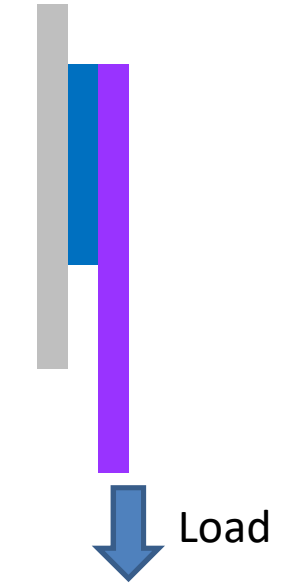
① Load due to displacement of adhesive / adherend interface
② Load due to elongation (deformation) of adhesive
① + ② = calculated as adhesive strength.

Basic physical properties of adhesion

■ Three physical properties of adhesion

2. Holding power

The holding force is defined as "the force that the adhesive can withstand misalignment when a static load is applied to the adhesive tape". This represents the cohesive strength of the adhesive layer.
It is said that this strong adhesive is hard to cause adhesive residue.



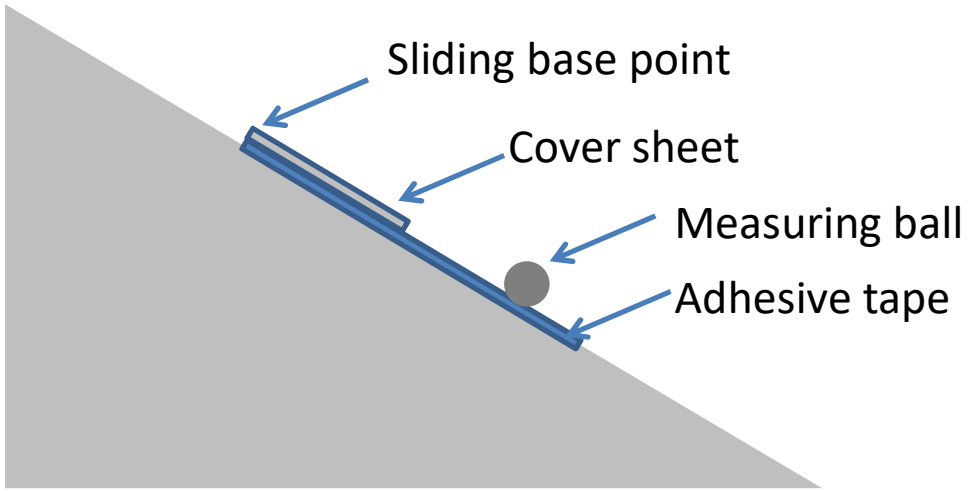
① Resistance to deformation in the longitudinal direction
② Hardness of adhesive
Performance evaluation items including ① and ②

Basic physical properties of adhesion

■ Three physical properties of adhesion

3. Ball Tack

Tack is defined as "the force that adheres to an adherend in a short time with a light force". It is "sticky". Stickiness and adhesion are totally different elements. Some stickiness is high but some adhesion is low.



Measurement

Basic physical properties of adhesion

◎Viscoelasticity of adhesive and glass transition temperature

・・・One of indicators to judge physical properties of pressure sensitive adhesive

What is the glass transition temperature?

The transition point between the rubber state and the glass state is called the glass transition point (Tg)