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Introducing the insulation sheet "IKEPON"

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Agenda

What is insulation?

1-1. Insulators and conductors

1-2. Principle

1-3. Types of insulators

2. Product description of "IKEPON" insulating sheet by
Kyodo Giken Chemical Co., Ltd.

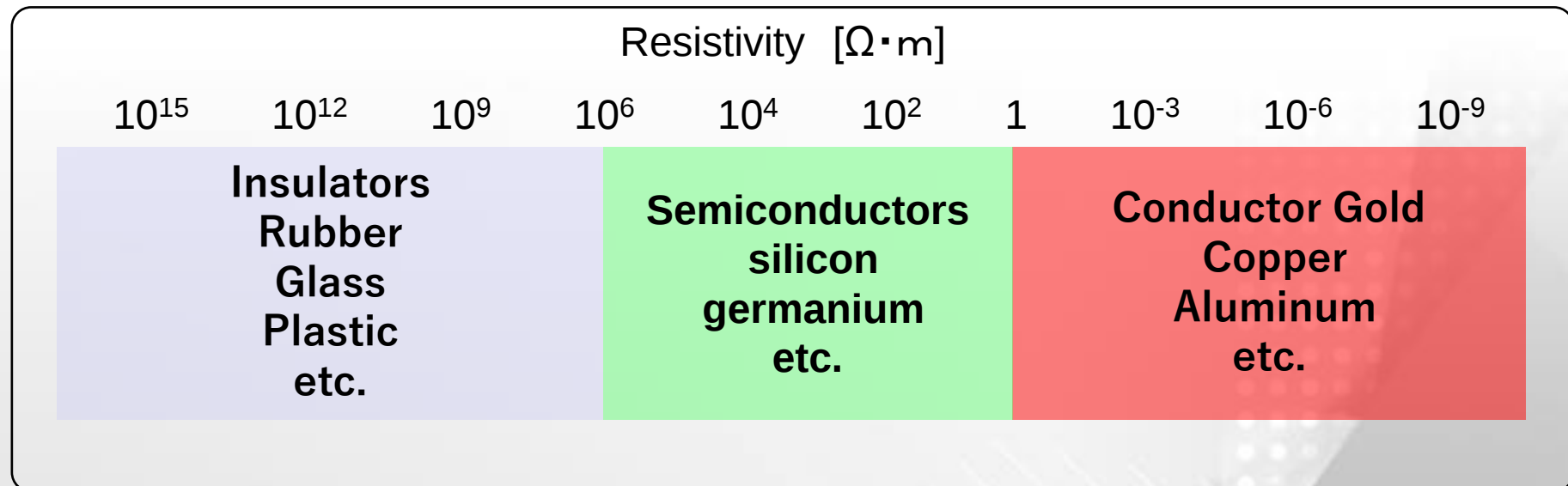
3. Examples of uses for "IKEPON"

1. What is insulation?

1-1. Insulators and conductors

Materials that do not conduct electricity well, such as glass and rubber, are called insulators. On the other hand, materials that conduct electricity easily, such as gold and copper, are called conductors, and anything in between are called semiconductors. Insulators are all around us, used in home appliance cords to prevent electric shock, and in the touch panels of electrical appliances to react to the human body.

When the ease with which electricity passes through insulators and conductors is expressed as resistivity, the difference in resistivity is as follows:



1. What is insulation?

1-2. Principle

★Conductor

All matter is made up of atoms, and atoms have atomic nuclei and electrons. Atomic nuclei are positively charged and electrons are negatively charged, so they exist because they attract each other. The phenomenon of electricity flowing occurs when negative electrons move away from the positive nucleus.

For this reason, conductors that easily allow electricity to flow are materials in which electrons can flow easily.

★Insulator

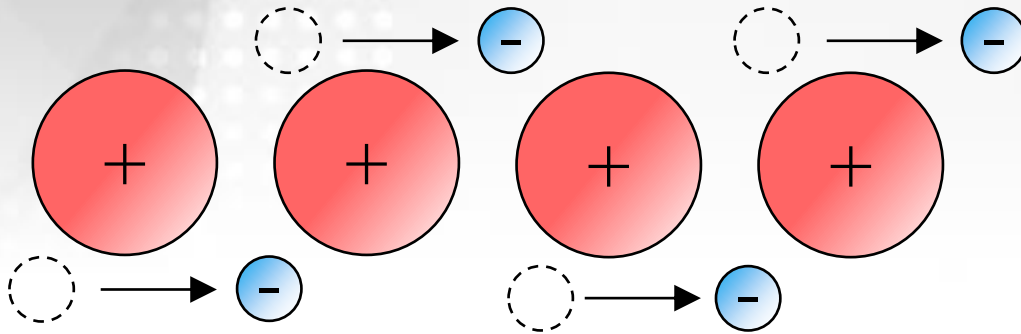
In contrast to conductors, insulators are materials through which electrons have difficulty flowing.

The ease with which electrons flow through conductors and insulators comes from their atomic structure. In conductors, the attractive force between the positive atomic nucleus and negative electrons is weak, allowing electrons to move easily, but in insulators, the attractive force is strong, making it difficult for electrons to move. As a result, even if you try to pass electricity through an insulator, the electrons do not move and no electricity flows.

1. What is insulation?

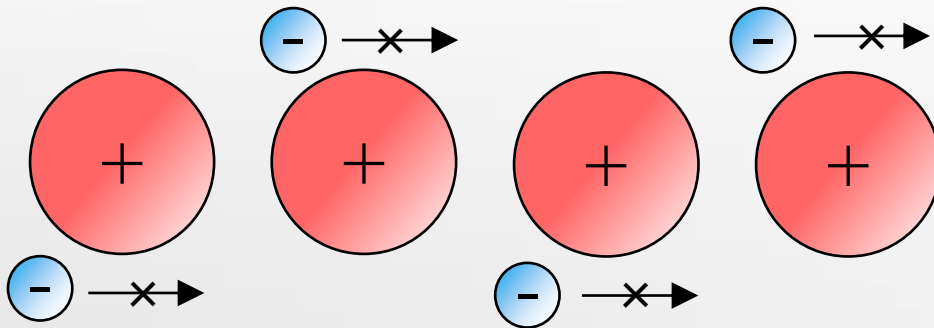
1-2. principle

conductor



In materials such as metals, the bonds between positively charged cations and negatively charged anions are weak, and when an electric charge is applied, the electrons move
→ electricity flows

Insulator



Unlike metals, insulators have strong + and - bonds, so electrons do not move even when an electric charge is applied
→ electricity does not flow

2. What is insulation?

1-3. Types of insulators

★Rubber

Well known as a material that does not conduct electricity, it generally has very high insulating properties.

★Plastic

There are a wide variety of plastic insulators. From general-purpose plastics such as polyethylene (PE), polypropylene (PP), vinyl chloride (PVC), and acrylic (PMMA), engineering plastics such as polyacetal (POM), polyamide (PA), and polycarbonate (PC), and thermosetting resins such as phenol (PF) and epoxy (EP) are also insulators.

★Ceramic

Some types of ceramics have lower electrical resistance when heated or pressurized, making them more conductive.

★Glass

At room temperature, glass is an insulator, but when glass containing sodium and other substances is heated and begins to melt, the ions become mobile and the glass becomes electrically conductive.

2. What is insulation?

1-3. Types of insulators

★Wood

Wood is highly insulating when dry, but when it absorbs moisture due to humidity, its insulating properties drop significantly.

★Oil

Oil is highly insulating, but when it absorbs metal or water, it can become conductive. There is also insulating oil, which is used to insulate electrical systems and cool generated heat.

★Pure water

Water in nature contains metals and other impurities and conducts electricity, but pure water without impurities is classified as an insulator.

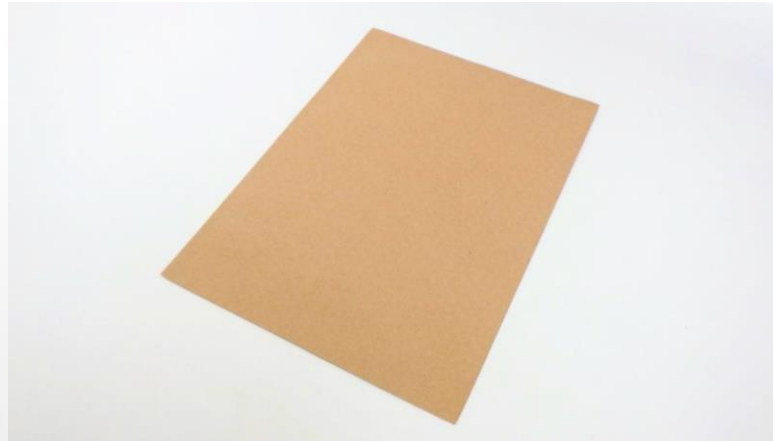
★Air

For example, power lines carry extremely high voltages of hundreds of thousands of volts, making it difficult to insulate even with highly insulating materials. For this reason, insulation is ensured by keeping the wires far away from the ground and from each other, and allowing sufficient air to pass between them.

2. Product description of "IKEPON" insulating sheet manufactured by Kyodo Giken Chemical Co., Ltd.

★Features

- ① Acrylic resin base, heat resistant and insulating
- ② No tack at room temperature, easy to handle
- ③ High tack appears when heated, allowing for good adhesion
- ④ Flexible and stretchable, can conform to uneven surfaces



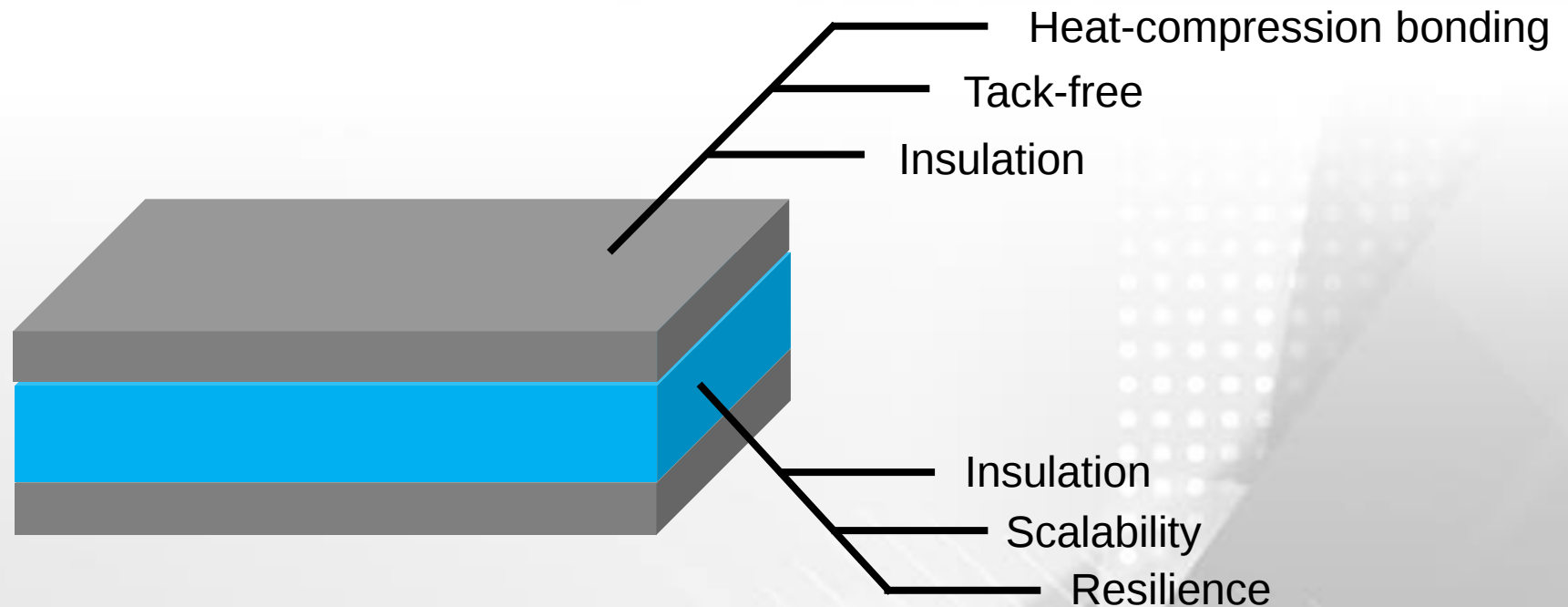
★Uses

Applications requiring adhesion, heat resistance, and insulation through thermocompression

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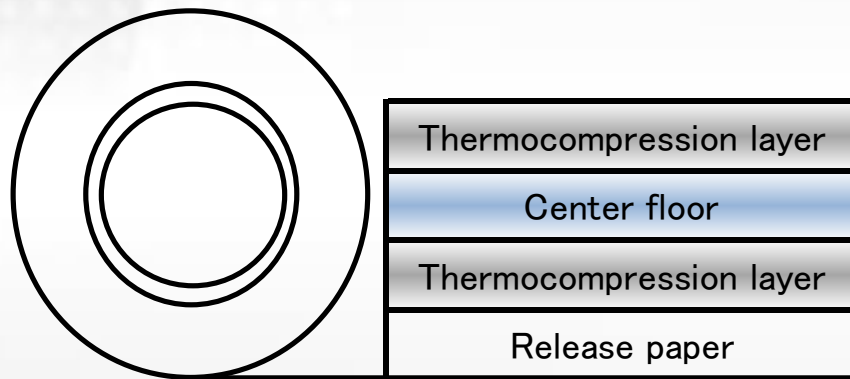
★ Design thinking

By adding various functions to each layer, we have created a multi-functional thermo-compression insulating sheet with excellent mechanical and electrical properties.

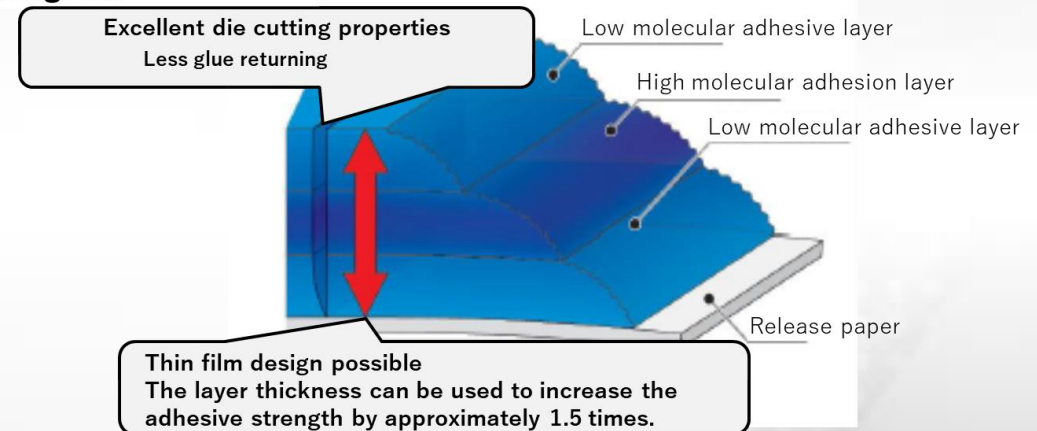


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★composition



Diagram



★Instructions

It adheres to the substrate by thermocompression at a temperature of 60°C~120°C
(The thermocompression layer penetrates into the unevenness of the substrate surface to achieve adhesion)

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★Characteristic

■Basic characteristics

Thickness (μm)	After heat bonding Adhesion [※] N/25mm	Tack
150	11.4	none

*Bonding conditions: 120°C x 20s x 0.3MPa
Substrate: Metal plate with rough surface

■Mechanical properties

Breaking strength (N/10mm)	Elongation rate (%)	Softening temperature °C
11.3	160	About 60°C

■Electrical characteristics

Insulation resistance value (Ω)	Dielectric constant (ϵ_r)		
	1KHz	100KHz	10MHz
$> 5 \times 10^7$	3.4	3.0	2.6

3. Examples of uses for "IKEPON"

★LAN cable



★USB cable



※The photograph is an image

Contact between electrical wires can lead to breakdowns, so they need to be covered with an insulator to prevent electrical contact.

3. Examples of uses for "IKEPON"

★Touch PC, Tablet PC



★Smartphone



※The photograph is an image

In the "resistive film" touch panel system, electrodes are placed on the top and bottom. When an electrode is pressed with a finger, the top and bottom electrodes come into contact and electricity flows, detecting input.

In this case, an insulator is used between the top and bottom electrodes to prevent them from touching each other when no input is being made.

最後に End of presentation

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