

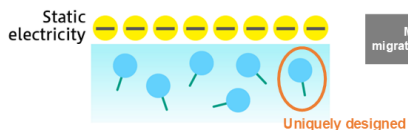
Static Electricity Release Molecular Design Technology

A molecular design technology for “anti-static agents” that prevents dust from adhering to plastic bottles due to static electricity. Molecules compounded into the plastic in advance migrate to the surface after molding, forming a conductive film that dissipates static electricity. Because this migration behavior varies depending on the properties of the plastic, molecules are designed to match each material, enabling stable performance without compromising appearance or tactile feel.

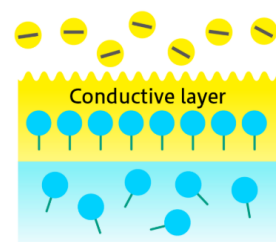
<Unique Points>

The key to removing static electricity is “migrating*”, in which molecules of the anti-static agents slowly migrate to the material surface after molding. We designed the molecules so that this phenomenon occurs stably even at low additive levels. *A familiar example of migrating is the whitening seen on the surface of chocolate stored for a long time, caused by oils separating inside the chocolate and migrating out to the surface.

Immediately after plastic molding

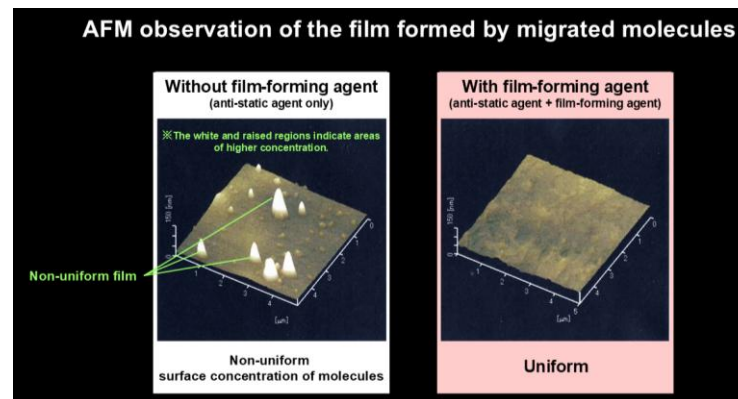


After several hours - days



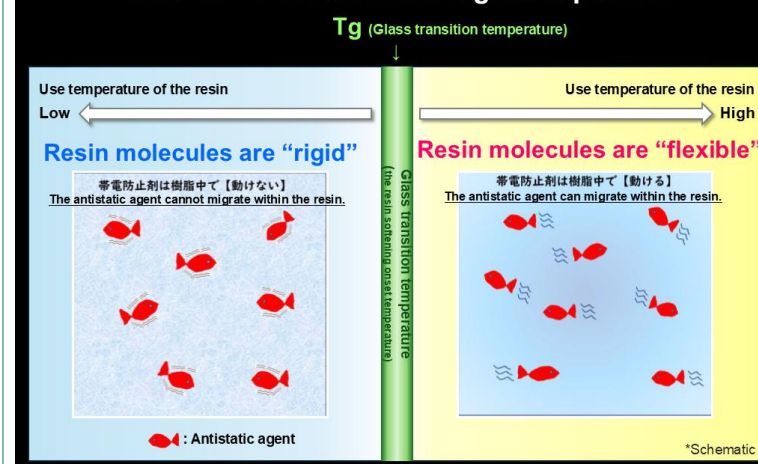
A film-forming agent is incorporated so that the film created by the migrated molecules spreads evenly and uniformly. This suppresses visual defects and tackiness, enabling the anti-static effect to be delivered stably over a longer period.

AFM observation of the film formed by migrated molecules



Because migrating behavior varies depending on the type of plastic and the bottle molding process, the molecular structure is designed and synthesized to match these characteristics. By applying expertise in interfacial science and synthetic chemistry, the technology can be tailored for a wide range of plastics.

Behavior of the antistatic agent in plastics



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<Key Benefits>

- Helps prevent dust and dirt attraction across a wide range of materials—from food containers to daily necessities and home appliances—helping maintain a dust-free product surface.
- Helps prevent production troubles and malfunctions caused by static electricity, supporting stable manufacturing and contributing to reductions in processing load and energy consumption.

<Link to Other Contents>

- Kao Chemicals Global: What is an anti-static agent?
https://chemical.kao.com/global/plastics-and-rubber/elec-and-elestmaster/about_antistatic/

<Concerned Research Areas>

- Product Development Research:
 - Industrial Chemicals
<https://www.kao.com/global/en/innovation/research-development/product-development/chemicals/>
- Fundamental Research:
 - Material Science
<https://www.kao.com/global/en/innovation/research-development/fundamental/material-science/>
 - Production Technology
<https://www.kao.com/global/en/innovation/research-development/fundamental/production-technology/>