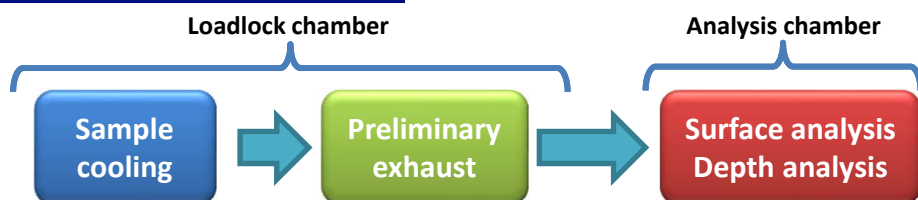


# The analysis of volatile components in anti-inflammatory tapes by means of Cryo-TOF-SIMS

Surface analysis methods generally need ultra high vacuum (UHV) condition. Therefore, it is impossible to analyze the samples including much volatile components which prevent exhaust of vacuum chamber (i.e. loadlock chamber). However, sample transferring system with cooling by liquid nitrogen enables the surface analysis for such samples.

## Overview of Cryo-TOF-SIMS



**Pressure**  $1 \times 10^3$  mbar  $< 1 \times 10^{-6}$  mbar  $\sim 1 \times 10^{-9}$  mbar

**Temp.** R.T  $\rightarrow$   $< -150^\circ\text{C}$   $< -120^\circ\text{C}$   $< -120^\circ\text{C}$

Surface analysis & depth analysis of samples which include much volatile components are possible by cooling samples to appropriate temperature.

## < Application >

- ① Evaluation of the distribution of residual solvents and volatile additives in polymer material.
- ② Evaluation of the distribution of components contained in biological samples in a water-containing state
- ③ High-precision depth analysis of the distribution of elements that are easily moved by ion etching, such as alkali metals.

## Evaluation of drug & additives distribution in anti-inflammatory tapes

Anti-inflammatory tapes contain much volatile components such as drugs and fragrances. Therefore, it is generally difficult to reduce the pressure down to the required levels for surface analysis. However, **sample cooling enables to analyze** them because volatilization is suppressed.

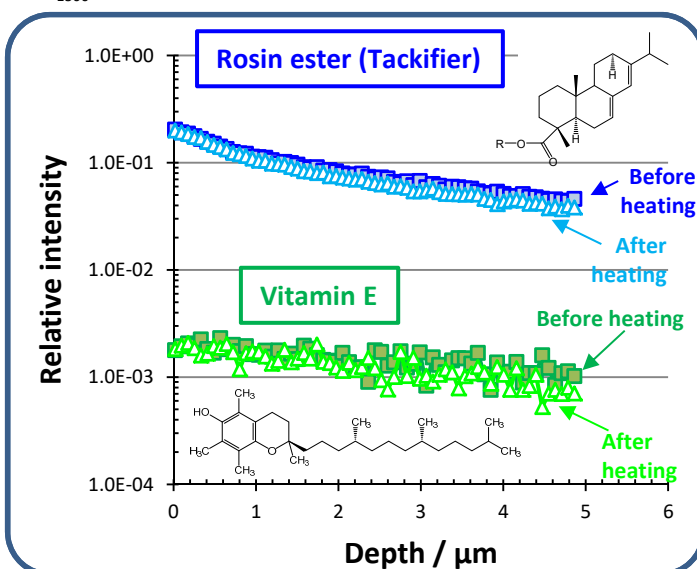
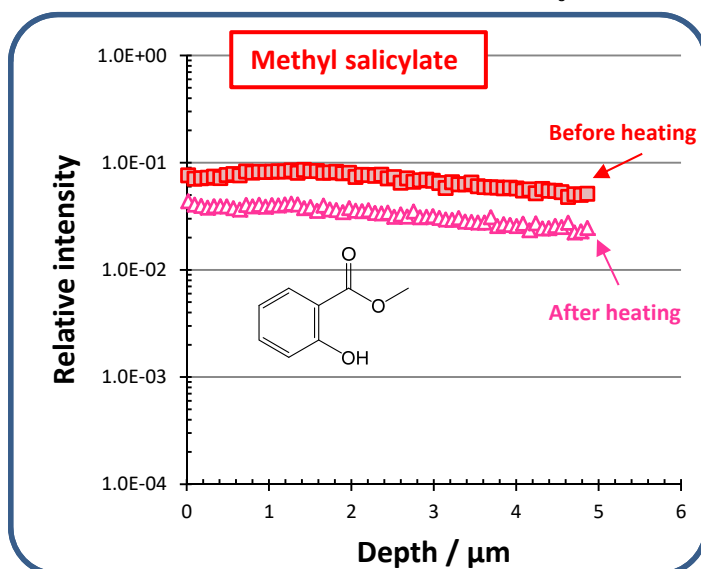
**Condition of heating test: 70°C, 2 hours**

Analysis condition of TOF-SIMS: **Temp.: approximately -150°C,**

Primary ion:  $\text{Bi}_3^{++}$ , Sputtering ion:  $\text{Ar}_{1500}^+$

## The examples of volatile components included in medical tapes

Components	Medicinal effect
Methyl salicylate	antiphlogistic, painkiller
dl-camphor	antiphlogistic, painkiller, antipruritic
l-menthol	Fragrance, antipruritic



In order to compare the distribution of the components before and after heating test, TOF-SIMS analysis was conducted after sample cooling down to  $-150^\circ\text{C}$  under atmospheric pressure. From the results of TOF-SIMS depth analysis with sample-cooling, it was confirmed that methyl salicylate, which was one of the volatile components, were decreased by heating test. On the other hand, no much changes of the distribution of rosin ester and vitamin E, which were non-volatile components, were observed.