Tohoku Univ. Technology

Analysis and visualization method for medium element

Development and evaluation of food processing, preservation and transportation technologies by using single X-ray image obtained from NanoTerasu

Overview

Synchrotron radiation analysis (X-ray CT) using a single X-ray beam is a nondestructive analysis used in many fields such as food, medicine and chemical industry. In the food industry, it is used to improve taste and texture, as well as to develop preservation and transportation methods that maintain quality.

This invention is about a method to analyze (evaluate) a sample based on the proof that the contrast of image appearing in X-ray CT image is due to the distribution and migration of medium element such as Na and Cl, which are contained in the sample and can easily affect the food product quality.

The right figure shows an example of proving that the contrast on the X-ray CT image of a frozen and thawed pollock surimi gel (kamaboko) is due to the migration of the middle element by analyzing the linear absorption coefficient of each element. This invention and the CT image taken at the next-generation synchrotron radiation facility "NanoTerasu" which is scheduled to be operational in 2024 are expected to accelerate the development of processing, preservation and transportation technologies in the food industry, as well as the material analysis other than food product that contain medium element (mineral).

Product Application

- X-ray CT image analysis software (for medium element analysis)
- Food field technology development by using image analyzed by above software
- Analysis of industrial product and material that contain medium element

IP Data

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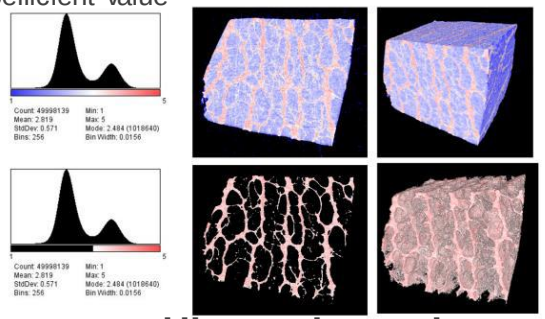
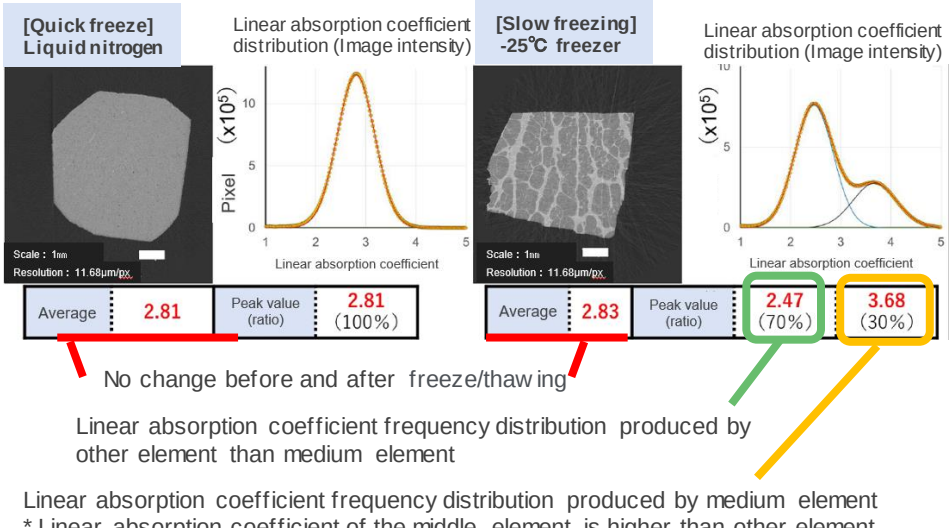
Visualization of light and medium element area based on linear absorption coefficient value



X-ray CT image and linear absorption coefficient distribution for different freezing methods

Result of 4 repeated freezing and natural thawing (sample: surimi gel of Alaska pollock)



The contrast that appeared in [slow freezing] was proved to be due to the migration of Na, Mg, Cl, K, and Ca (the localization area of middle element is in white)

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