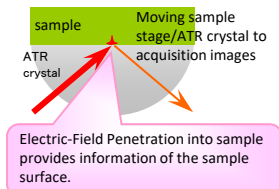


# Visualization of molecular orientation in human hair ~Using ATR FT-IR imaging~

ATR FT-IR imaging is a powerful tool for visualization of molecular orientation distribution as well as functional group distribution on sample surface. We investigated the difference in molecular orientation distribution on the longitudinal section of human hairs that were treated by two types of reducing agents.

## Principle of ATR FT-IR (Attenuated Total Reflection) mode and feature of imaging measurement



### ■ Features

- Collect sample information approximately 1  $\mu\text{m}$  depth from sample surface.
- Spatial resolution: approximately 3~5  $\mu\text{m}$ .
- Maximum imaging region: 400  $\mu\text{m}$   $\times$  400  $\mu\text{m}$ .

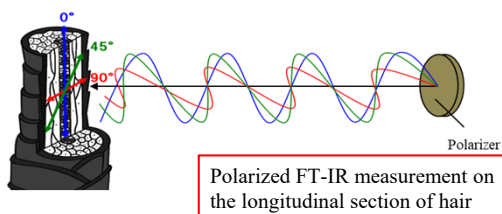
### ■ Materials for ATR FT-IR imaging

- Polymeric materials  
Industrial material, Packaging material, Medical material etc
- A part of the specimen  
Hair, Skin, Tissue etc
- Medicinal drug
- Foreign object matter

### ■ Information

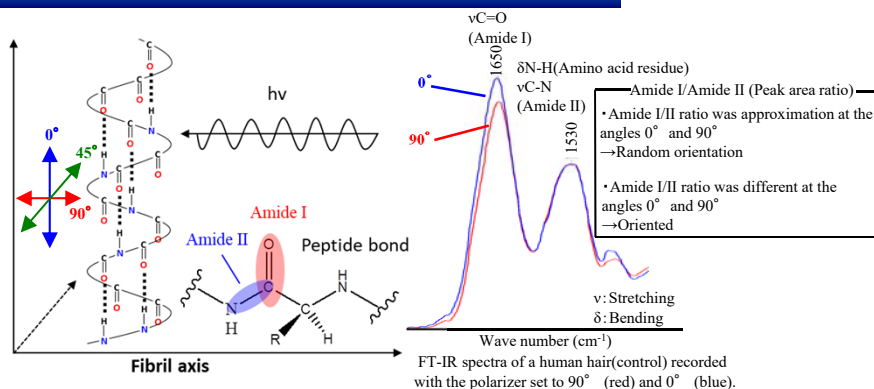
- Degradation (structural change)
- Penetration (component distribution)
- Adhesive (cure extent)
- Diffusion, Compatibility
- Dispersion
- Molecular orientation

## Polarized FT-IR measurement of a human hair

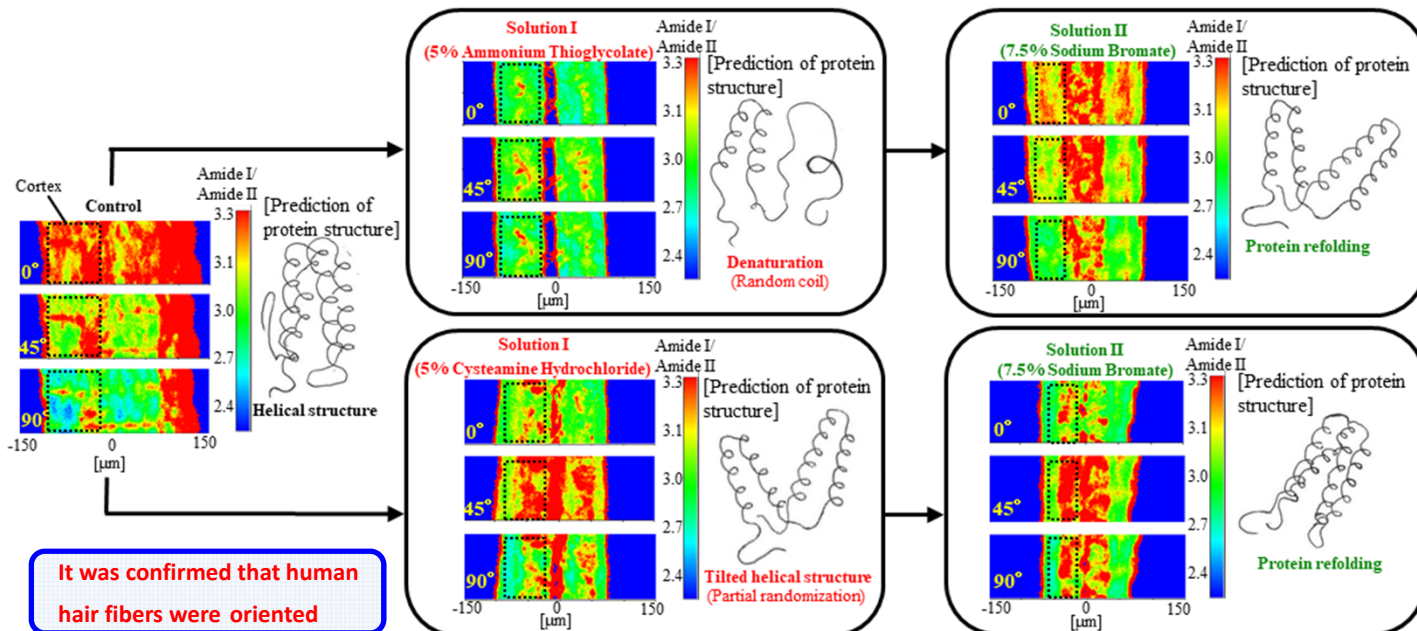


Amide I/II ratios were calculated from FT-IR images obtained by polarization at the angles of 0°, 45° and 90°, respectively.<sup>1)</sup>

1). X. Bi Ph.D., G. Li Ph.D., S.B. Doty Ph.D., N.P. Camacho Ph.D./A novel method for determination of collagen orientation in cartilage by Fourier transform infrared imaging spectroscopy (FT-IRIS) *Osteoarthritis and Cartilage* (2005) 13, 1050-1058



## Molecular orientation distribution in human hairs that were treated by reducing agents



FT-IR-ATR imaging allows us to visualize the distribution of molecular orientation with high spatial resolution