News Release

MILBON

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Milbon Awarded an "Outstanding Presentation Award" at the 22nd Joint Conference on Industrial Applications of SPring-8

-Evaluation of Internal Structure in Bleached Hair Using Small Angle X-ray Scattering and X-ray Computed Tomography-

Milbon Co., Ltd. (head office: Chuo-ku, Tokyo, President and CEO: Hidenori Sakashita), a manufacturer of salon-exclusive haircare products and cosmetics, has conducted research focusing on microstructural changes in bleached hair using the large synchrotron radiation facility SPring-8[*1], and analyzed the mechanisms of internal cavity formation induced by bleaching. The results were presented at the 22nd Joint Conference on Industrial Applications of SPring-8 and received an "Outstanding Presentation Award."

This Conference is a forum for sharing industrial application results achieved through SPring-8 and includes an award system that recognizes outstanding presenters. In the poster presentation category this time, two "Outstanding Presentation Awards" were selected from among 54 presentations.

[Award Overview]

Report meeting: The 22nd Joint Conference on Industrial Applications of SPring-8
Title of presentation: Evaluation of Internal Structure in Bleached Hair Using Small Angle X-ray Scattering and X-ray Computed Tomography
Presenter: Hironori Kimura

[Research Overview]

It is known that chemical treatments such as hair coloring and perming can cause cavities to form within the hair as a type of damage. At Milbon, we have conducted research focusing on cavity formation within hair using X-ray CT measurement[*2] at SPring-8 and have identified repair components that effectively fill cavities in damaged hair.

News releases to date related to the cavity formation within hair (Japanese only)

1. Milbon Discovers a Hair Damage Phenomenon: "Stick-shaped Voids" [News Release, April 27, 2016]
2. Milbon Successfully Conducts High-precision Observation of Hair Using X-ray CT Scanning [News Release, February 2, 2021]

However, the mechanisms of cavity formation had not been fully elucidated.In this study, to elucidate the mechanisms of cavity formation, we combined X-ray CT measurement with small-angle X-ray scattering measurement[*3] to evaluate in detail the microstructural changes in hair undergoing progressive cavity formation due to bleaching.

[Future Vision]

Based on these results, we aim to further elucidate the mechanisms of cavity formation within hair and to establish fundamental care techniques to prevent its occurrence and progression. Through these efforts, we will advance the development of high-performance products that maintain the suppleness and beauty of

hair after chemical treatments such as hair coloring.

≪Terminology≫

*1 Large synchrotron radiation facility SPring-8

Located in Harima Science Park City, Hyogo Prefecture, Japan, SPring-8 is a RIKEN facility that can deliver the world's most powerful synchrotron radiation. The name SPring-8 is derived from Super Proton ring-8 GeV (8GeV, or 8 giga electron volts). Synchrotron radiation, consisting of powerful beams of electromagnetic radiation, is produced when electron beams—accelerated to nearly the speed of light—are forced to travel along a curved path by a magnetic field. SPring-8 uses this radiation to conduct various scientific research, including nanotechnology and biotechnology, as well as industrial applications.

Reference: SPring-8 website（http://www.spring8.or.jp/en/）

*2 X-ray CT measurement

Technology that captures the internal state of an object in a non-destructive manner.

In this study, X-ray CT measurement using the world's most powerful synchrotron radiation at the BL24XU beamline of SPring-8 has enabled high-precision imaging of the internal microstructure of hair. Part of this study is an outcome of research conducted as a General Proposal for Industrial Application 2021B3264 at the Japan Synchrotron Radiation Research Institute (JASRI).

*3 Small angle X-ray scattering measurement

X-rays irradiated onto an object scatter in various directions within that object. By measuring X-rays with small scattering angles, small-angle X-ray scattering provides structural information on the scale of several to tens of nanometers.

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