June 4, 2010

Sharp Confirms Three Skin Beautifying Effects from Water Molecule Coating— Preserves Skin Moisture as Well as Improves Skin Elasticity and Texture

Mechanism Behind Skin Moisture Preservation by High-Density Plasmacluster Ions*1 (25,000 Ions/cm^3)*2 Explained

Sharp Corporation, in collaboration with Professor Michio Niwano of the Research Institute of Electrical Communication at Tohoku University, has proven that the skin moisture preservation effect of high-density Plasmacluster Ions (density of 25,000 ions/cm^3) announced in February of this year*3 is based on a mechanism in which the water molecules of the ions form a “water molecule coating” on the surface of the skin.

Further, through testing commissioned to Soiken Inc.*4, it was proven in actual living spaces (floor area of approximately 9.8 m^2 to 13.2 m^2) that three skin beautifying effects*5 can be obtained based on the water molecule coating function. The three effects are retaining skin moisture*3 (previously announced), improving skin elasticity, and improving skin texture.

Plasmacluster is Sharp’s proprietary air purification technology based on positive and negative ions generated by applying a plasma discharge to the moisture and oxygen in the air. Working with academic research organizations around the world, Sharp has thus far proven that Plasmacluster technology is effective against 28 kinds of harmful substances. Research has also confirmed its safety*6.

Sharp currently has 11 of its own Plasmacluster-application products, and 24 companies in other business fields have also adopted Plasmacluster technology for use in products*7 as diverse as railway coaches and car air conditioners. In addition, the use of in-vehicle and professional-use Plasmacluster products is expanding to a wide variety of spaces including hotels, daycare facilities, and taxi interiors.

Sharp will use this new proven efficacy of Plasmacluster Ions to work toward even more widespread use of products incorporating Plasmacluster technology in the home, as well as in the office and in vehicles.

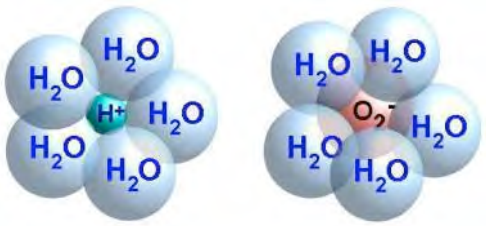
*1 Plasmacluster Ion and Plasmacluster are trademarks of Sharp Corporation.
*2 A measure of the number of ions/cm^3 emitted into the air measured at a point near the center of a room (at a height of about 1.2 m from the floor) having an appropriate floor surface area, during operation at the “high” airstream setting, when the high-density Plasmacluster Ion generator is placed near a wall.
*3 Announced on February 17, 2010.
*4 Soiken Inc. conducts clinical trials on a contract basis for the development of pharmaceuticals and foods.
*5 Effect will vary depending on the individual.
*6 Testing conducted by Mitsubishi Chemical Medience Corporation, including tests for inhalation toxicity and for skin and eye irritancy and corrosivity.
*7 Ion density differs with each product.

1. Mechanism for preserving skin moisture by high-density Plasmacluster Ions (25,000 ions/cm^3) explained

The positive and negative ions generated by the plasma discharge are surrounded by water molecules, and remain suspended in the air (Figure 1). Working in collaboration with Professor Michio Niwano of the Research Institute of Electrical Communication at Tohoku University, it was confirmed that the water molecules surrounding the ions adhered to the surface of a substance simulating human skin, forming a “water molecule coating.” As a result, the mechanism by which the evaporation of water molecules from the skin is inhibited, thereby making it possible to obtain a moisturizing effect, was revealed. (Figure 2)

In testing, a Plasmacluster Ion generator was placed in a spectroscopic instrument to analyze the molecules of water. Infrared absorption spectroscopy (IRAS) with multiple internal reflection (MIR) geometry*8 was used to confirm the presence of a water molecular layer (water molecule coating)*9 on the surface of a plate designed to simulate human skin*10 when ions were being generated and when they were not being generated. It was confirmed that, when no ions were generated, there was no adhesion of water molecules. In contrast, when ions were being generated, the adhesion of water molecules was confirmed after approximately ten minutes*9 of ion generation, and it was shown that, after the generation of ions was stopped at approximately 80 minutes, the water molecule coating function persisted for several dozen minutes. (Figure 3)

*8 A method to detect chemical substances adhering to solid surfaces with high sensitivity.
*9 A plate made of a silicone is used.
*10 The water molecule layer is several nanometers (nm) thick; 1 nm = 1 millionth of a mm.



Water molecules in the air surround the positive and negative ions, forming stable cluster ions*11.

Figure 1: Schematic drawing of Plasmacluster Ions (conceptual rendering)

*11 These ions are shaped like clusters of grapes.

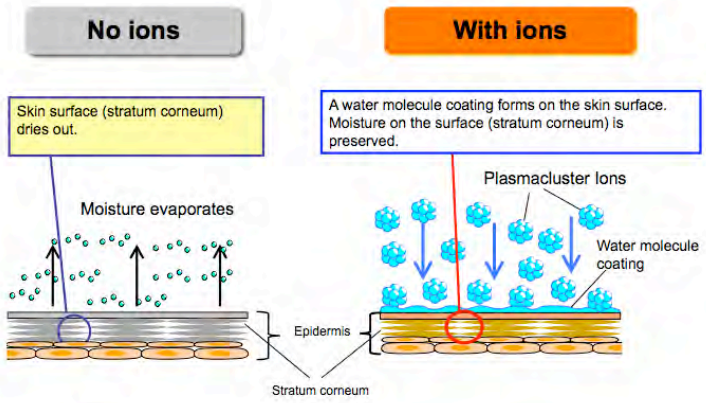


Figure 2: Skin moisture preservation mechanism (conceptual rendering) Water molecule coating function

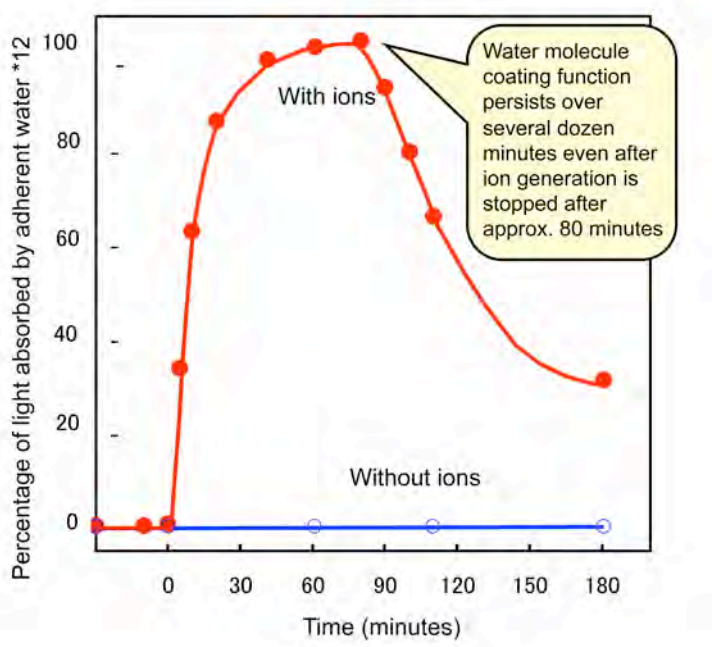


Figure 3: Change over time in percentage of light absorbed as a result of adherent water

*12 The higher the percentage of light absorbed by adherent water, the more water molecules attached to the skin.

Comments by Professor Michio Niwano of the Research Institute of Electrical Communication at Tohoku University

It was quite surprising that Plasmacluster Ions surrounded by water molecules adhered to the surface so readily. We also confirmed that Plasmacluster Ions readily adhere to surfaces where proteins have adsorbed, so the moisturizing effect of Plasmacluster Ions on the skin can be fully accepted. I hold out great expectations that this Plasmacluster technology will be able to find even wider application in the health-related field.

About the Research Institute of Electrical Communication at Tohoku University

The Research Institute of Electrical Communication (RIEC) was established in 1935 as a research institute affiliated with Tohoku Imperial University to study the theory of higher-order information and communication technologies and their practical application. The Institute takes the view that everything from the basic science of materials and information, to devices, circuitry, architectures, and software to generate, identify, transmit, store, process, and control information forms an integrated system. Based on organized collaboration with researchers inside and outside the Institute, it strives to extend its research findings to other areas and integrate its activities with groups working in other fields.

2. Proof of three skin beautifying effects based on the water molecule coating function of high-density Plasmacluster Ions (25,000 ions/cm^3)

1) Preserves skin moisture*13

The graph at the right shows the moisture preservation effect announced on February 17, 2010.

The fact that it is based on this water molecule coating function has now been explained.

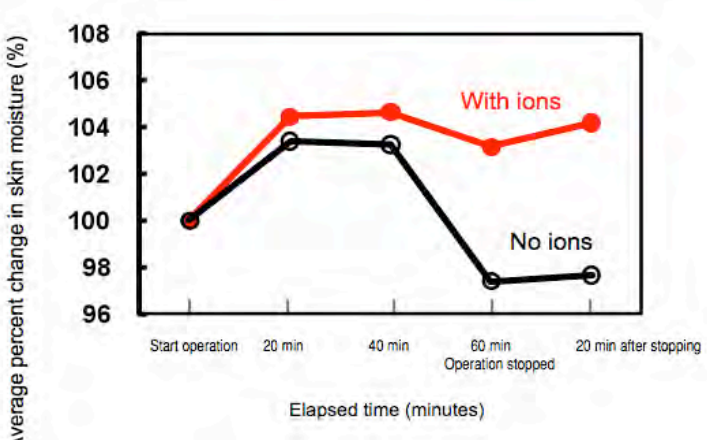


Figure 4: Change in skin moisture

*13 Test conditions for confirming the skin moisture preservation effect: a Plasmacluster Ion generator was set up in a testing room having a floor area of approximately 9.8 m^2 with the temperature adjusted to 28°C and humidity around 40% relative humidity (RH). Tests were conducted on 13 healthy female subjects ranging from 20 to 65 years of age. Announced on February 17, 2010.

2) Improves skin elasticity*14

A Plasmacluster Ion generator was used daily upon retiring at night. The elasticity of the skin was measured using a Cutometer® MPA580*15, an instrument commonly employed in medical research, at 14 days and 28 days after the start of use. The results confirmed that the elasticity of the skin in the cheek area of the face, which is regarded as an indicator of skin age*16, improved when the Plasmacluster Ion generator was used. (Figure 5)

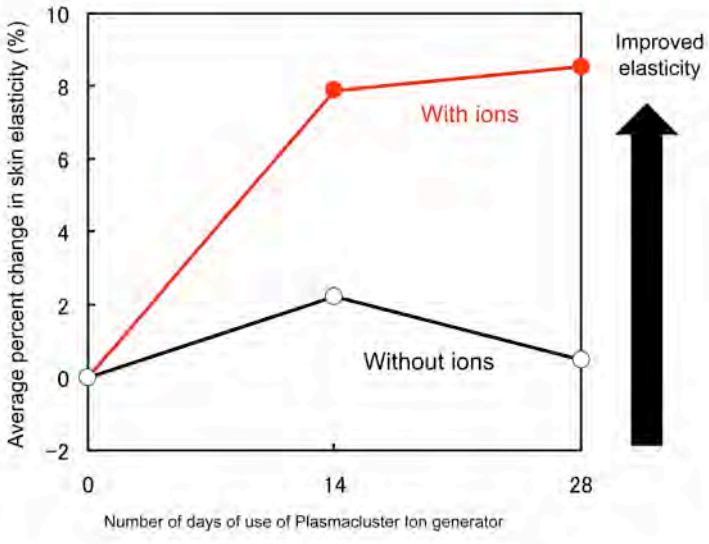


Figure 5: Change in skin elasticity

*14 A Plasmacluster Ion generator was set up in actual living spaces having floor areas of approximately 9.8 m^2 to 13.2 m^2. Tests were conducted on 24 healthy female subjects ranging from 30 to 65 years of age. The Plasmacluster Ion generator was used at bedtime every day for a period of 28 days, the time required for the skin to renew itself through natural cellular metabolism.

*15 Manufactured by Courage + Khazaka Electronic Gmbh.

*16 “Skin age” is an indication of the level of skin aging, for example, the degree to which the skin is firm and healthy looking, etc., expressed in number of years, and is used as guideline for skin care.

3) Improves skin texture*[14]

Test subjects used a Plasmacluster Ion generator on a daily basis only upon retiring at night. After 28 days of use (the time required for the skin to renew itself through natural cellular metabolism), the condition of the skin underneath the outer corner of the eye was examined by microscope. As a result, it was confirmed that skin texture improved after use of the Plasmacluster Ion generator. (Figure 6)

Figure 6: Example of change in skin condition (30X photomicrograph)

In addition, an opinion questionnaire using a Visual Analogue Scale (VAS) survey instrument*[17] was administered to the 24 test subjects to elicit their subjective responses to the test.
As a result, statistically significant responses were obtained for items such as “The skin is moister,” “Make-up goes on more smoothly and evenly,” and “The skin feels soft” after the Plasmacluster Ion generator had been used, when compared to not having used the Plasmacluster Ion generator.

*17 A method employed in the medical field that uses numerical values to objectively evaluate subjective perceptions, such as the severity of pain.

Comment by Mr. Tomohiro Sugino, Representative Director of Soiken Inc.
Following on the skin moisturizing effect announced in February of this year, these current tests prove the effectiveness of Plasmacluster Ions in improving skin elasticity and skin texture. It is believed that these effects are the result of the skin being coated with water from Plasmacluster Ions. Based on this proof, Plasmacluster technology can be expected to be one measure for skin care.

About Soiken Inc.
Soiken was founded as Soiken Limited in 1994 and underwent reorganization to become Soiken Inc. in 2001. The company has since been developing businesses related to medical marketing support and providing specific health care advice related to lifestyle diseases, as well as conducting clinical trials of foods and devices, making use of its independently developed technologies for biomarkers and assay systems.