



# WATERLESS BŌSHI BEAUTY

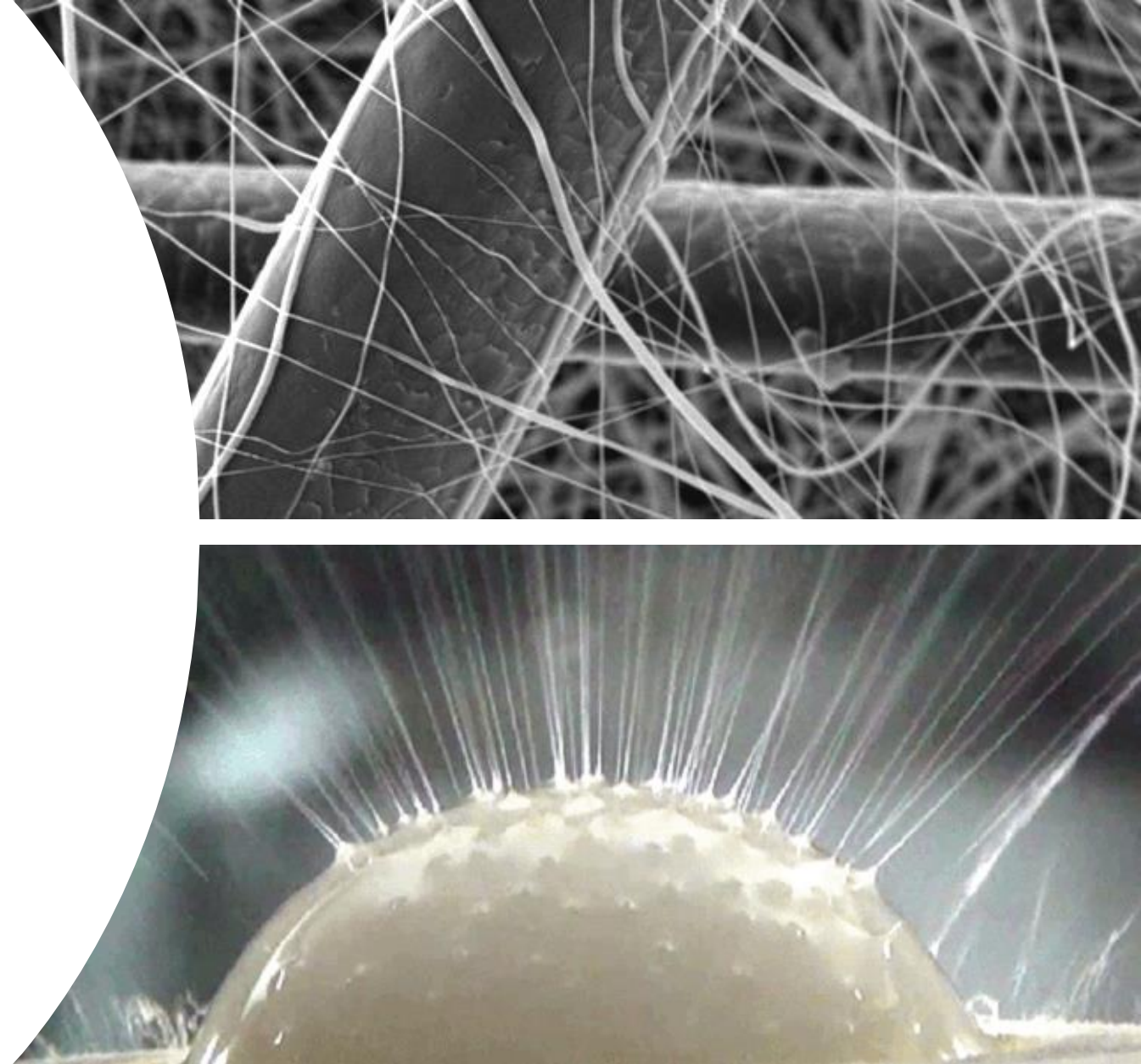
Formulating with Nanofibers



NEW YORK  
Society of Cosmetic  
CHEMISTS

# WHAT ARE NANOFIBERS?

- Generally understood as fibers with a diameter of  $< 1$  micron
- Can be produced using a variety of processes, but electrospinning is most common
- Can be made from many different polymers, but our focus is on water-soluble polymers for cosmetic applications



# NANOFIBER COSMETICS

Made from water-soluble polymers

- Natural- Hyaluronic Acid, Pullulan
- Synthetic- PVP, PEO

Electrospun nanofibers are collected as nonwoven sheets.

They can be die cut into various shapes or layered and cut into dissolving nanodrops.



# SIMPLE FORMULAS

- Low water Activity
- Dry fiber format
- Polymer fibers + actives





# HIGHLY CONCENTRATED ACTIVES

- Ingredient supplier recommends concentration for actives
- Bōshi fibers- waterless + fewer ingredients means lower overall mass
- Requires actual desired dose to be calculated



# LAYERED SYSTEMS

- Each layer can contain a different active
- Allows actives to remain isolated from one another until applied
- Hard to disperse powders can also be placed in between electrospun fiber layers



TaikiUSA



Boshi Beauty Inc.

# STABILITY / PRESERVATION



ENTRAP OR  
ENCAPSULATE ACTIVES



DRY FORMAT



ALTERNATIVE TO FREEZE  
DRYING

# HOW TO INCORPORATE

## Dry powders

- If water-soluble, can be dissolved into polymer solution
- Non-water-soluble particles can be incorporated within the solution (if micron size or smaller) or between fiber layers.

## Liquids

- Depending on solubility and target concentration, can be added directly to spinning solution.
- Oils can be added as a secondary process to the dry fiber nonwoven sheet.





# SUSTAINABILITY

- With just the fibers and functional ingredients, Bōshi products are lightweight, requiring less energy to ship.
- Fewer ingredients means fewer resources (water, energy, etc.) are needed to produce the formulation.
- Base polymers (Pullulan and HA) are both produced via sustainable processes.



# Benefits of Bōshi



SIMPLE FORMULAS



WATERLESS



LIGHTWEIGHT

# Acknowledgements

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*Thank you all for your kind attention!*

## References:

1. Stojanov S and Berlec A. Electrospun Nanofibers as Carriers of Microorganisms, Stem Cells, Proteins, and Nucleic Acids in Therapeutic and Other Applications. Front. Bioeng. Biotechnol. **2020**, 8 (130). doi: 10.3389/fbioe.2020.00130
2. Golpira, F. , Maftoonazad, N., Ramaswamy, H.S. Evaluation of Freeze Drying and Electrospinning Techniques for Saffron Encapsulation and Storage Stability of Encapsulated Bioactives. J. Compos. Sci. **2021**, 5, 326-345. <https://doi.org/10.3390/jcs5120326>.

# THANK YOU

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