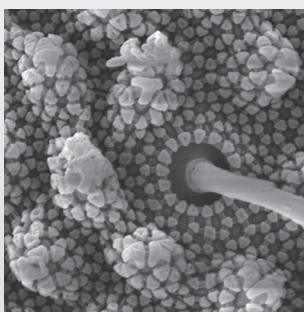


Material  
Research



Life Science  
Research

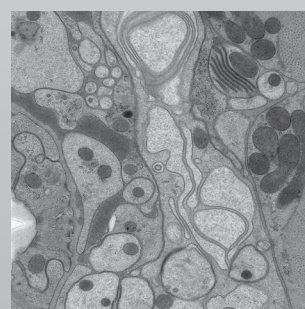
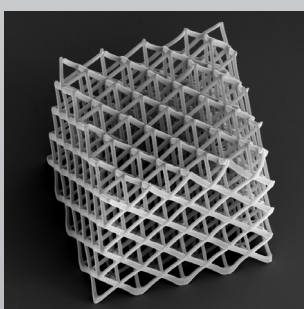
## Application Note

# UV light stimulated sun screen lotion

related instruments Leica EM ICE, Leica EM VCT500,

Leica EM ACE600

Medical  
Research



Industrial  
Manufacturing



Natural  
Resources



# High pressure freezing with light stimulation

## Cryo-SEM analysis of UV light stimulation sun screen lotion

### PROCEDURE

Sun screen lotion\* was carefully filled in the 100  $\mu\text{m}$  incision of a 3 mm copper/ gold plated flat carrier and covered with 3 mm sapphire disk. The sun screen lotion sample was then high pressure frozen with a Leica EM ICE with and subsequently without light stimulation. The light stimulated samples were exposed to a UV light for 500 milliseconds (continuous exposure). Details of the experiment are displayed in the table below.

Light stimulation intensity (mW/mm <sup>2</sup> ) at the sample surface	6.0
LED colour	UV
LED wave length (nm)	385
Period (ms) (total duration of the experiment)	500
Pulse (ms) (exposure to light stimulation)	500

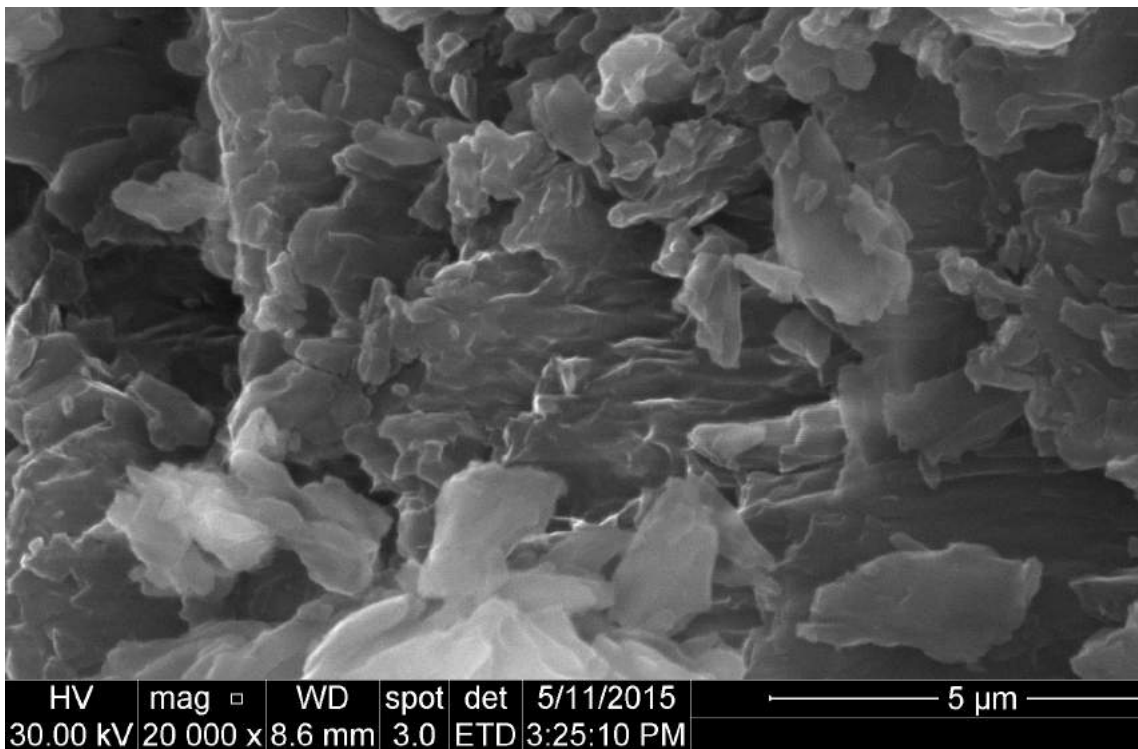
The frozen sample sandwiched between the 3 mm carrier and the sapphire disk was mounted on a universal sample holder in a cooled Leica EM VCM loading station and transferred into a Leica EM ACE600 using a Leica EM VCT500 shuttle. Samples were fractured by pushing off the sapphire disk (top side) with the fracturing knife at -110°C (after 10 minutes waiting period). Next the sample was partially freeze-dried at -100°C (15 seconds hold time) and sputter coated with a 2nm layer of platinum. Samples were then transferred onto the Leica EM VCT500 cryo-stage in a FEI Inspect S50 scanning electron microscope (SEM) using the Leica EM VCT500 shuttle keeping the specimen under high-vacuum conditions and actively cooled. Secondary electron images were acquired at -120°C (high tension: 30 kV).

Sun screen structure in general allows for absorption of high-energy ultraviolet rays and release the energy as lower-energy rays. The UV-attenuating efficacy will depend on particle size of the inorganic particles and the nature of the organic components as well as the specific proportion of the specific components. This composition specificity will define the ratio of absorption and scattering of UV light by the sun screen system. The images depict the structural changes in a sun screen sample exposed to UV light for 500 milliseconds in comparison to the same sample without UV exposure.

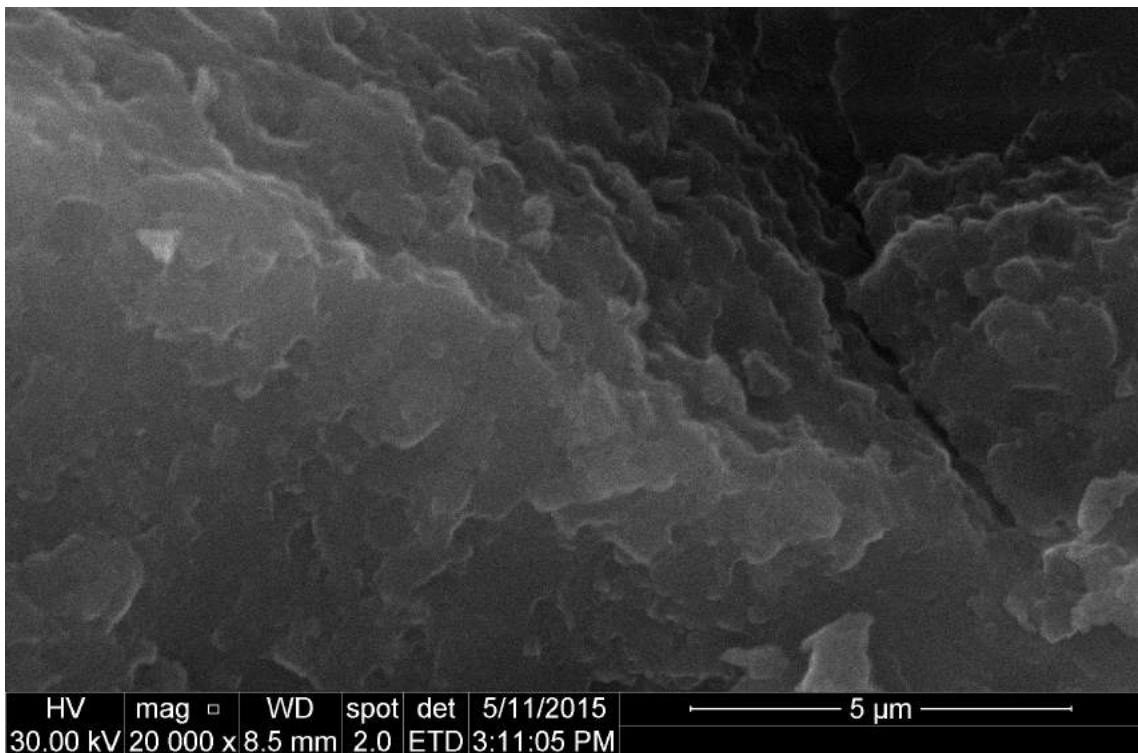
*Samples prepared May, 2015 by Cveta Tomova Ph.D. and Saskia Mimiety-Deckler Ph.D. Leica Microsystems, Vienna, Austria. Pictures taken May, 2015 by Dietmar Pum Prof., University of Natural Resources and Life Sciences, Vienna, Austria.*

\*The trade mark and SPF (sun protection factor) of the product are not mentioned intentionally.

## RESULTS



**Fig. 1** Sun Screen Lotion high pressure frozen without UV light exposure



**Fig. 2** Sun Screen Lotion high pressure frozen 500 milliseconds after UV light exposure

RELATED PRODUCTS



Leica EM ICE



Leica EM ACE600



Leica EM VCT500

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