

Investigation of lotion distribution in wet wipes by pore network model and X-ray micro tomography

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Wet wipes are products of, e.g., baby and skin care. They consist of substrate and washing lotion. The substrates are non-woven sheets made from two or three selected types of fibers with diameters in the range of 10-20 microns.

During production, lotion is initially applied to the substrate surface at one side. Then, within a short time, the applied lotion flows into the substrate and redistributes inside, both due to capillary action. This may lead to undesired lotion saturation on the substrate surface, which is a key factor of product quality.

We developed a pore network model to predict how the lotion distribution evolves in a single wipe after lotion application to its surface. The pore network representing the substrate is generated with the pore volume distributions as obtained from X-ray micro computed tomography (μ -CT) on the real substrate. In addition, μ -CT is utilized to image the wet wipes and extract the real lotion saturation profile for validation of model results.