

## **Development of artificial skin for optical performance evaluation of makeup cosmetics**

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In the current cosmetics industry, when developing make-up cosmetics and evaluating its appearance, a visual assessment has been performed by applying the cosmetics to human's skin. An evaluation using artificial skin using a resin material has been attempted, but it is not used for final evaluation of cosmetics. Since the present artificial skin cannot completely reproduce the characteristics of light propagation inside and surface of the living human skin, the appearance of the artificial skin is different from the living skin. In this study, we proposed a method that can individually adjust three optical properties and surface structures to create the artificial skin reproducing the appearance of the living human skin.

As for the absorption coefficient, it was shown that the mass concentration of dye and the absorption coefficient have linearity, so that the absorption coefficient can be controlled. With regard to the scattering coefficient and phase function, it was suggested that the scattering coefficient and phase function of the skin can be reproduced by controlling the particle diameter and particle volume fraction based on Mie theory. From these results, it was shown that artificial skin reproducing the optical properties of living human skin can be created by individually controlling the absorption coefficient by some dyes and the scattering coefficient and scattering phase function by white particles.

Three machining methods such as cutting, sandblasting and shaking were tried on the A5052 substrates to reproduce the characteristics of surface reflection on the human skin. Subsequently to the developing the surface structure, the surface structure data was measured using a laser microscope. These data indicated that it is possible to create a structure that can reproduce the optical characteristics on the human skin surface by combined several machining methods appropriately.