

Construction of world’s first technology for controlling “ultra” fine structure of a lipstick: superb shine and color and smooth application

KOSÉ has realized the world’s first “ultra” fine structure of a lipstick and has constructed technology for controlling the structure. The application of this technology enabled dramatic improvements in important qualities of lipsticks such as shine, color, and smoothness of application.

The predominant lipstick on the market is of the stick type. It is made of solid wax and liquid oil which form a structure called a wax-oil gel. The fine structure of the gel is a “card-house structure” which is a framework constructed of crystallized solid wax (Figure 1). The structures were previously changed by using different types of wax and oil or varying proportions of wax and oil in the mixture. The usability of lipsticks was improved in these ways, but the structures could not be controlled precisely.

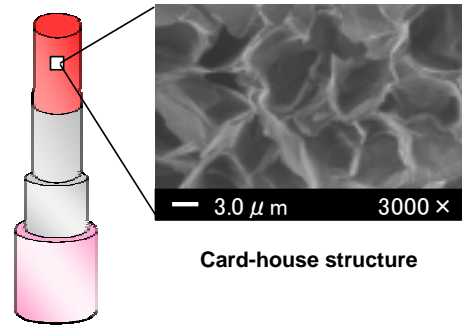


Figure 1. Fine structure of stick-type lipstick
The white areas in the image are wax and spaces between those areas are liquid oil.

KOSÉ has focused on the interior wall of the card-house structure in a lipstick. Fine and uniform wall surfaces could reduce resistance during use and enable an even uniform application of cosmetic film, improving both usability and shine. First, a transmission electron microscope (TEM) was used to construct technology to visualize an “ultra” fine structure at magnifications of approximately 200 times more than those of existing technology. The interior wall of the card-house structure were found to be layered with alternating crystalline phases and amorphous phases, instead of uniform wax phases (Figure 2).

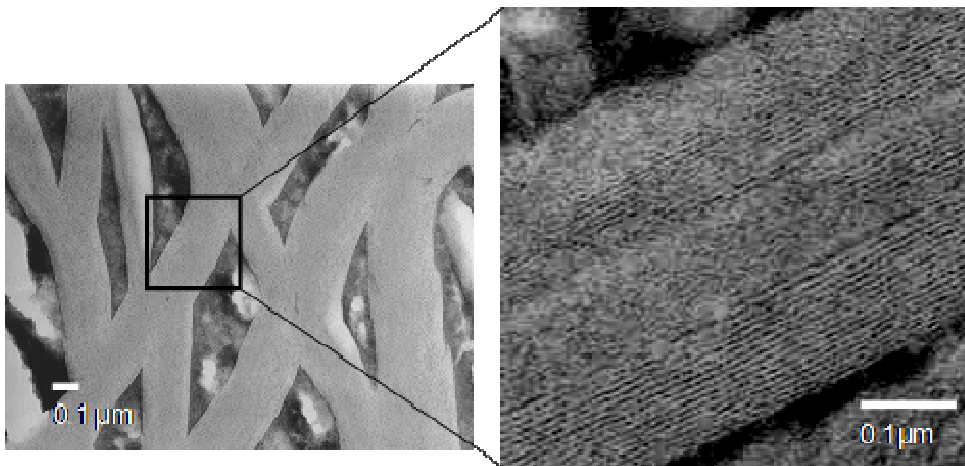


Figure 2. “Ultra” fine structure of lipstick: (left) magnification 20000x, (right) magnification 100000x. The right image shows layers of alternating string-like amorphous phases stained black and string-like white crystalline phases in one sheet of wax crystal.

A close distance between the layers was expected to create a thin and strong layered structure. Thus, KOSÉ has begun to develop amorphous materials which allow for strong binding between crystalline phases. As a result, we discovered that the new polymer “amorphous polypropylene” had the ability to reduce the distance between layers in the layered structure. This new polymer is synthesized using a new metallocene catalyst. “Amorphous polypropylene” in the formulation was found to reduce the thickness of the amorphous layer by 10% compared to that of the conventional amorphous layer and to form a fine and even uniform card-house structure (Figure 3).

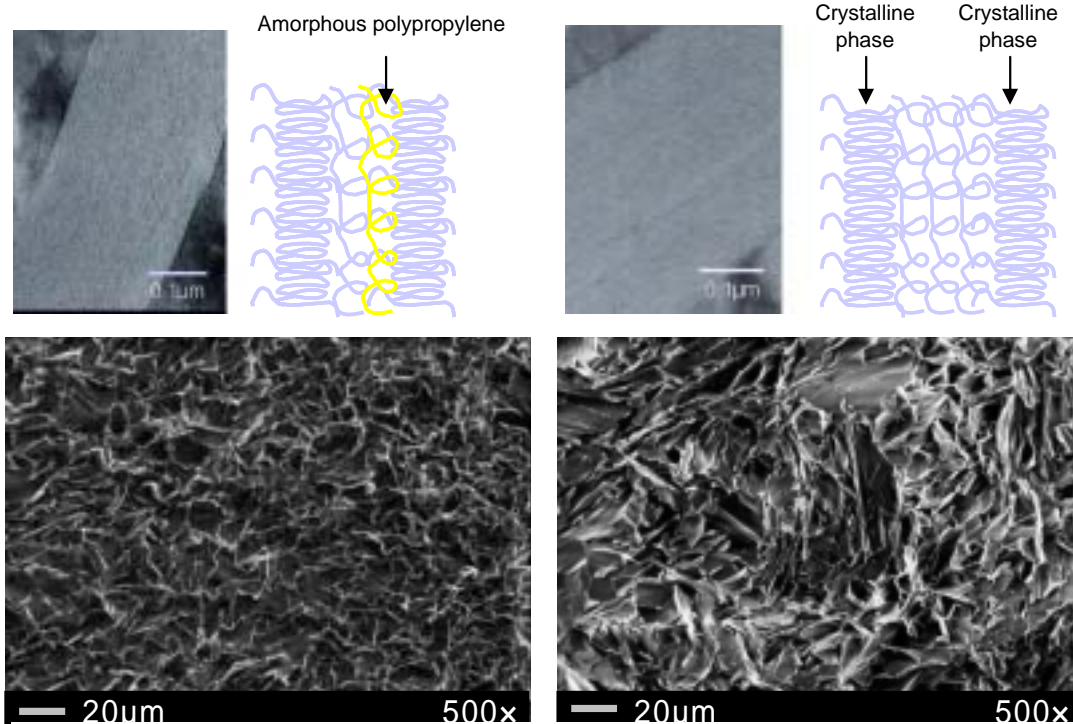


Figure 3. Controlled card-house structure with amorphous polypropylene (left) and conventional card-house structure (right)

The image with the new material “amorphous polypropylene” shows that there was controlled formation of a fine and uniform structure.

This technology enabled the formation of lipsticks with very low resistance when applied and improved smoothness during use. Furthermore, the surface of the applied lipstick film became uniform, resulting in a superb finish with dramatically improved color and shine on the lips (Figure 4).

The content of this study was orally presented at the 25th Congress of the International Federation of Societies of Cosmetics Chemists (IFSCC) in Barcelona, Spain on October 6, 2008. KOSÉ plans to apply this technology to other cosmetic products such as eye shadow and foundation.

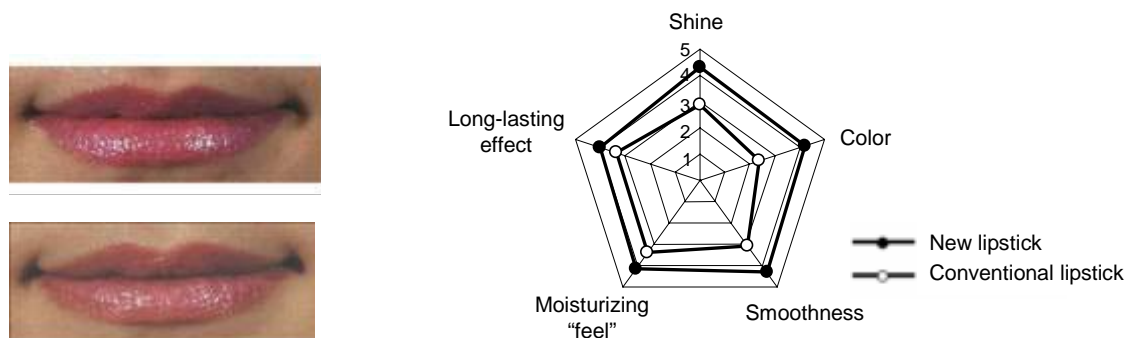


Figure 4. New lipstick (upper left), conventional lipstick (lower left), and evaluation of the “feel” of the lipstick by professional panel members (N=15) (right).

The new lipstick meets the high standards of qualities that are important in lipsticks and has well-balanced compositions of these qualities.