

**[p16] X-ray diffraction, an efficient tool for industry: the case of Cosmetic Research.** J.L. Lévêque, *L'OREAL Recherche, Clichy, France.*

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Cosmetic products are complex formulations designed in order to adorn, protect, treat lips, skin, hair and nails. To be safe and efficient, these products have to fit with the biological substrates on to which they are applied. This is the reason why X-ray diffraction studies, beside several others, are used for exploring the structure nature and properties of these complex keratinized tissues.

X-ray diffraction studies were carried out by our research teams since about 10 years in cooperation with scientists from LURE and ESRF. They successively addressed the molecular and supramolecular organisation of proteins and lipids of hair, stratum Corneum (SC : external keratinized layer of the epidermis) and the nail. Other studies were related to the exploration of phase domains in emulsions. The influence of some molecules and/or finished products on some of the structural characteristics of materials were studied for understanding changes in their properties.

Concerning SC and hair, our studies have demonstrated, for the first time, supramolecular organisation of lipids (bilayers) which, at least in the SC, play a major role in the skin barrier function. The influence of some molecules on the organisation of these bilayers shed light on their role in both efficacy and safety purposes. Structural characteristics of keratin  $\alpha$  and  $\beta$  were also precised as well as their organisation in terms of proto and microfilaments. Influence of water molecules on these structural dimensions was described and discussed. The use of a X ray microbeam allowed to demonstrate the various types of organisation of the keratin filaments in the 3 compartments of the nail plate. This peculiar organisation of the structure, close to that of a composite, probably explains the singular properties of the nail.

New research works are now in progress concerning the Life Science domain, specially concerning the keratinization process taking place in the follicle.

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