

Development of a novel cosmetic material based on structural colorization of giant molecular aggregates mainly consisting of phospholipids

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A novel structural color material was developed using millimeter-sized giant molecular aggregates formed in phosphatidylcholine (PC) /cholesterol (Chol) /stearic acid (SAC)/ water systems. A lipid mixture consisting of PC, Chol and SAC (5: 5: 1 in molar ratio) was dissolved in n-hexane and placed onto aqueous phases with various pH, then n-hexane was removed by evaporation under ambient conditions in order to form giant molecular aggregates in the aqueous phase. At low pH (< 8), film-like aggregates were obtained, while spherical aggregates were formed at high pH (> 8). Small/Wide angle X-ray scattering measurements revealed that the molecular aggregates exhibited the liquid crystalline polymorphism. Spherical aggregates formed at high pH exhibited structural color depending on the salt concentration of their external aqueous phase. The measurement results of reflection spectra of visible lights from the giant molecular aggregates indicated that their tunable colorization was attributed to change in the internal structure of the giant molecular aggregates. Above findings would contribute to develop biocompatible colorization materials for potential cosmetic application without any dyes or pigments.