

Preparation of Polymer-deposited Nanocapsules for Cosmetic Delivery System

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In this research, we carried out internal and surface modifications of liposomes to prepare nanosized capsules with various functional properties including improved incorporation of active agents and controlled release of cargo in response to external stimuli. For internal modification of liposomes, anionic polymers were generated within liposomes by living radical polymerization. The obtained nanocapsules showed good absorption and retention of chemical substances depending on the binding ability to the incorporated polymers, and the absorption capacity could be controlled by the length and dissolved state of the polymer chains. In addition, surface modification of liposomes was carried out by the layer-by-layer deposition of enzymes and polysaccharides to prepare capsule walls with enzymatic degradability. First, lysozyme (Lyso) and phosphorylated chitosan (P_{CHI}), which is cleavable by Lyso, were deposited over the liposome. Then, hyaluronic acid (HA) was deposited as an outermost layer. The degradation of the inner layer consisting of PCHI allowed the release of the outermost layer consisting of HA. Also, degradation of the PCHI layer led to the exposure of the lipid membrane, which facilitated the release of cargo from the inner cavity of the liposome. We expect that polymer-deposited nanocapsules would open up application potential as a carrier for delivery of active agents to the targeted skin region.