

Polymeric nanocapsules containing methylcyclohexane for improving thermally induced detachment of thin adhesive films

문기태, 우종표, 손인태, 이은비, 박윤국, 윤준식, 김준혁,
황세훈, 이준협[†]
명지대학교
(junhyuplee@mju.ac.kr[†])

The thin adhesive film with tunable interfacial adhesion can be applied in a broad range of display applications, from optically clear films to flexible devices. We have fabricated adhesive films including evaporable polymeric nanocapsules which can form thermally induced bubble gaps at the interface. These nanocapsules consisted of a poly(methyl methacrylate) core and a polyethyleneimine shell, and were impregnated with methylcyclohexane as a vaporization material. The evaporated core materials facilitated the detachment of thin adhesive film through bubble formation on the adhesive interface after thermal treatment, resulting in improved detachment of the adhesive layer. The optimization of the bubble gaps was performed to adjust the adhesive strength by varying the duration and temperature of thermal treatment, as well as the quenching temperature. The evaporable adhesive film with nanocapsule concentration of 1.0 wt % resulted in high transmittance of 94.9%, with the best adhesive strength reduction of 57.6% obtained after thermal treatment.