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Adsorption-desorption Behavior of Weak Polyelectrolytes Deposition on Aminolyzed-PLA Non-woven

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Abstract : In this study, the adsorption-desorption behavior of poly(amidoamine) (PAMAM) as a polycation and poly (acrylic acid) (PAA) as a polyanion deposited on aminolyzed-PLA nonwoven through layer-by-layer technique (lbl) was studied. The adsorption-desorption behavior was monitored by UV adsorbance spectroscopy and turbidity tests of the waste polyelectrolytes after each deposition. Also, the drying between each deposition step was performed to study the effect of drying on adsorption-desorption behavior. According to UV adsorbance spectroscopy of the waste polyelectrolyte after each deposition, it was revealed that drying has a great effect on the deposition behavior of the next layer. Regarding the deposition of the second layer, drying caused more desorption and removal of the previously deposited layer since the turbidity and the absorbance of the waste increased in comparison to pure polyelectrolyte. To deposit the third layer, the same scenario occurred and drying caused more removal of the previously deposited layer. However, the deposition of the fourth layer drying after the deposition of the third layer did not affect the adsorption-desorption behavior. Since the adsorbance and turbidity of the samples that were dried and those that were not dried were the same. As a result, it seemed that deposition of the fourth layer could be the starting point where lbl reached its constant state. The decrease in adsorbance and remaining turbidity of the waste same as a pure polyelectrolyte can indicate that most portion of the polyelectrolyte was adsorbed onto the substrate rather than complex formation in the bath as the subsequence of the previous layer removal.

Keywords : Adsorption-desorption behavior, lbl technique, poly(amidoamine), poly (acrylic acid), weak polyelectrolytes
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