

Fabrication of oxygen barrier via layer-by-layer self assembled graphene-polyelectrolyte multilayers

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Transparent and flexible polymeric barrier films have been extensively used for food packaging, flexible electronics and prescription medicines. Up to now, a complexed polymeric film with clay has been normally employed due to its cost efficiency and lightweight property. However, since the size of clay is only ranged from 100 to 1000 nm, it is difficult to be exfoliated as a single layer. Also, a secondary aggregation of clays has been a challenging problem. In the present work, graphene nanaosheets are introduced to lower the oxygen permeability of the polymeric films. Due to a relatively high aspect ratio of graphene compared to the clay, graphene nanaosheet can efficiently decrease the oxygen transmission rate within the barrier films. Therefore, enhanced property as a gas barrier will be beneficial for a wide range of applications.