The Barrier Coating Deposition In Plasmas

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The search for effective gas and humid barrier coatings has been extensively explored for various applications such as food packaging, OLED and quantum dots envelopment, vacuum insulation panels, biomedical application, renewable organic energy, protective coating, etc [1-3]. Over the past decades, polymeric-based substrates have received significant attention due to their functionality, low cost, lightweight, easy processing, and appreciable mechanical properties such as excellent tensile strength and high flexibility. The polymeric materials commonly used in packaging application are polypropylene (PP), polyethylene (PE), polyvinyl chloride (PVC), polyethylene terephthalate (PET), polyvinyl alcohol (PVA), ethylene vinyl alcohol (EVA), and polylactic acid (PLA). These polymers have a high versatility, and their barrier properties are one of the most important factors in food packaging and microelectrics sealing applications. In general, the packages made from polymeric materials are permeable at different degrees to small molecules like gases, water vapor, and other low molecular weight volatile compounds presented in the food or medical. In order to block the permeation, barrier layers deposited in plasma are efficiently way since plasma assists or enhances the chemical vapor deposition or atomic layer deposition in high depostion rate, high quality, low process temperature, and so on. In this talk, we will review the plasma sources used in PECVD or PEALD in our laboratory for the barrier coating deposition[4,5]. The works introduced here will be from plasma diagnostic, coating structure and properties, to reactive mechanism.

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