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ENHANCED BARRIER FOR LIGHTWEIGHT-PET-BOTTLES

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Even though PET-bottles gain more and more market shares there are disadvantages concerning their insufficient permeation properties. To overcome this weakness and to extend the shelf-life of sensitive beverages like beer, carbonated soft drinks (CSD) or fruit juices, microwave excited low pressure plasma polymerisation is a well-known and one of the most effective techniques to enhance the barrier properties regarding O₂- and CO₂-permeation. Using this technique, effective barrier-coatings are deposited on the inside of the bottles with a thickness of 20-80 nm, a highly cross-linked structure and a low strain tolerance. In order to increase material efficiency the weight of PET bottles constantly decreases leading to a reduced wall thickness and therefore poorer permeation properties of the package. Furthermore the strain induced due to the bottle pressure in CSD-applications is likely to damage the coating thus allowing higher permeation. Studies show that the deposition of double-sided coatings leads to a significant increase in the barrier properties because the negative effect of layer defects is reduced. Further investigations using a substrate bias will be carried out to specifically influence flexibility of the coatings and reduce layer defects.