

The properties of oxygen barrier and antiabrasive coating films prepared by sol-gel method

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Plastic film has disadvantages which are permeable to gases, water vapor and the low abrasion resistance. The aim of this study is to develop coatings on polycarbonate thin films with a combined increase in oxygen barrier property, hardness, based on organic-inorganic hybrid materials. These organic-inorganic hybrid materials were prepared using a acrylate end capped polyester oligomeric resin, hexanedioldiacrylate(HDDA) as acrylate monomer, 3-(trimethoxysilyl)propoxymethacrylate(TMSPM) as a coupling agent between the organic and tetraethylorthosilicate(TEOS) as a inorganic precursor. The resulting oxygen permeability of coating films were investigated by permeation cell and antiabrasive property of coating films were investigated by pencil hardness, respectively. The silica content in the organic-inorganic hybrid materials was varied from 25 to 75 wt%. The organic-inorganic hybrid materials showed improved hardness and oxygen barrier properties with increasing content of silica. Presumably, these films comprise a dense network structure with organic groups, providing barrier and antiabrasive properties.