

### **350b Gas Barrier Properties of Polymeric Films with Hybrid Organic/Inorganic Coatings for Food Packaging Applications**

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The sorption and transport properties of O<sub>2</sub>, CO<sub>2</sub>, N<sub>2</sub> and water vapor in polymeric films of PET, PP and PVC coated with a thin layer of an hybrid organic/inorganic (ceramer) material have been determined, at temperatures up to 65°C. The ceramer layer is obtained via sol-gel technique and is composed of a polymer, as the organic phase, and of SiO<sub>2</sub>, as the inorganic phase. The addition of coating dramatically improves the gas barrier properties, the apparent permeability of the multilayer film being, in some cases, 2-3 orders of magnitude lower than that of the pure polymeric support. The reduction of gas permeation through the membrane depends strongly on the type of coating used and on the procedure followed during the synthesis and coating processes, and, more generally, on the degree of adhesion of the coating on the polymeric support. The effect of ageing on the barrier properties has been studied, by comparing the gas transport properties before and after immersion in water of the multilayer films, as well as the effect of the weight fraction and molecular weight of organic phase in the hybrid coating. The diffusivity values in the single layers of the film have been calculated based on the time-lag method, opportunely modified for taking into account the effect of the different diffusion resistances in the various layers.