Water absorption effects on the morphology of EMMA-Na+ ionomer by real time thermo-optical techniques

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The complexity of the morphology of semicrystalline ionomers like ethylene-methacrylic acid (E/MAA) has attracted the attention of the scientific community for more than forty years, due to its effect in their properties, such as high transparency, barrier to oils, self-repair capability, and others. To unveil this several characterization techniques have been applied, generating various morphological theories. Unfortunately none of them have taken into account the effect of water which is a relevant factor in the behavior of these ionomers. So far studies of the hygroscopicity of these ionomers did not generated enough information that could explain the interdependence of crystallinity degree and absorbed water content. In this work a systematic hydrothermal treatment was developed in order to submit E/MAA ionomer to swelling in water at particular times and temperatures. This effect have resulted in the increase of the *"regions of restricted mobility"*[1] and increase in the thickness of the secondary crystals[2], quantified by calorimetric and real-time birefringence measurements. The interpretation of these results is currently being done in light of the existing studies in the literature, to create a broader morphological model that would take into account factors such as the presence of water and crystallinity degree in such ionomers.

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