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X-ray characterization of hybrid PEO-clay nanocomposite films
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The objective of the present contribution is to understand how clays with different chemistry, sizes and surface areas interact with each-other and affect the structure and characteristics of polymer based nanocomposite multilayered films. In order to search for new synergistic properties and/or improve the properties of nanocomposite films already known, here we study polymer nanocomposites that have Laponite as well as Montmorillonite incorporated in various ratios. Although the polymer-clay solutions that are used to fabricate the nanocomposite films are completely exfoliated, XRD measurements confirm that all our dried multilayered films are highly structured. The X-ray reflections predominantly correspond to the PEO intercalated clay suggesting the presence of polymer- clay stacks in the system. We observed that the gradual replacement of Montmorillonite with equivalent amounts of Laponite in the nanocomposite films leads to an increase in the integrated and maximum intensities of the XRD intercalation peaks. The differences in the intensity of XRD peaks are attributed to variations in the size and aspect ratio of the two clays present in the films.

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