

ANALYSIS OF POLYMER MATERIALS WITH COMPLEX MORPHOLOGIES

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ABSTRACT

The solid state morphology of polymer materials to a large extent determines the physical properties of the materials and therefore also the potential applications that these materials may have. Developments in synthetic methodology have meant that we are now able to produce polymer materials with complex molecular architecture and composition. These materials often have complex solid state morphologies due to the incompatibility of the constituent components and in some cases as a result of one component which is able to crystallise. We will look at several examples of polymers with complex morphologies including organic-inorganic hybrid copolymers where the organic component is crystallisable and other semi-crystalline materials. Several common microscopy techniques such as SEM, TEM and AFM are discussed as techniques to characterise the morphology. In addition, other less common techniques such as Solid State NMR spectroscopy and positron annihilation lifetime will be discussed.