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## Analysis of polymer blend morphologies from transmission electron micrographs

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## Abstract

Thermomechanical properties of polymer blends seem to depend on their morphology on microscales and in particular on the size of the dispersed phase particles and/or their distances (ligament thickness). Precise characterization of morphologies by few simple geometrical parameters is often a quite delicate task, in particular because of the strong polydispersity of these systems. We present here a simple method based on image analysis of transmission electron micrographs (TEM) to estimate both distributions in particle size and ligament thickness. We first reconstruct three-dimensional distributions in particle size from two-dimensional measurements and show in particular that corrections from section thickness become significant when thickness is comparable to particle size. Knowing the distribution in particle size, we extend the model initially proposed by Wu to estimate the distribution in ligament thickness. This method provides a more detailed relation between the distribution in particle size and the distribution in ligament thickness. Advantages and limitations of the method are illustrated by practical examples on polyamide-12 systems filled with various particle dispersions. © 2005 Elsevier Ltd. All rights reserved.

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