

1. Record Nr.	UNINA9910300419903321
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Titolo	Fundamentals of Phase Separation in Polymer Blend Thin Films / / by Sam Coveney
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2015
ISBN	3-319-19399-6
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (179 p.)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	547.7046
Soggetti	Phase transformations (Statistical physics) Thermodynamics Materials—Surfaces Thin films Polymers Surfaces (Physics) Interfaces (Physical sciences) Phase Transitions and Multiphase Systems Surfaces and Interfaces, Thin Films Polymer Sciences Surface and Interface Science, Thin Films
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"Doctoral thesis accepted by the University of Sheffield, UK."
Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	Development of Theory for Bulk Polymer-Blend Systems. - Development of Theory for Polymer-Blend Thin Films -- Hamiltonian Phase Portraits for Polymer-Blend Thin Films -- Lateral Phase Separation via Surface Bifurcation -- Coupled Surface Roughening and Phase Separation.
Sommario/riassunto	This work sheds new light on fundamental aspects of phase separation in polymer-blend thin films. A key feature underlying the theoretical models is the unification of one-dimensional thermodynamic phase equilibria with film evolution phenomena in two- and three dimensions. Initially, an established 'phase portrait' method, useful for visualising and calculating phase equilibria of polymer-blend films, is generalised

to systems without convenient simplifying symmetries. Thermodynamic equilibria alone are then used to explain a film roughening mechanism in which laterally coexisting phases can have different depths in order to minimise free energy. The phase portraits are then utilised to demonstrate that simulations of lateral phase separation via a transient wetting layer, which conform very well with experiments, can be satisfactorily explained by 1D phase equilibria and a 'surface bifurcation' mechanism. Lastly, a novel 3D model of coupled phase separation and dewetting is developed, which demonstrates that surface roughening shadows phase separation in thin films.
