

Science Bridges China Research Profile

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SUMMARY OF MY RELEVANT RESEARCH AREAS:

1. Miscibility of polymer blends under different conditions
2. Influence of fillers on the morphologies and properties of polymer blends
3. Morphology and mechanical properties of polymer blends in micro injection moulding
4. Morphology and mechanical properties of polymer blends in solid phase processing

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Primary Research interests:

1. Study on the miscibility of polymer blends under static state

The miscibility of Polystyrene/Poly(styrene-co-acrylonitrile) (PS/SAN), was studied. PS/SAN blends show the UCST behaviour. The miscibility of binary polymer blends of PS/SAN was predicted based on both Flory's equation of state theory (EOS) and Wolf's theory on binary polymer blends of the A/AB style. The calculating and the experimental results were in accord with each other relatively well.

And the same time, the message of phase separation dynamic of EP/TPU blends was obtained through SALS method.

2. Study on the miscibility of polymer blends under shear field

A laser scattering measurement system with a shear unit was established. The apparatus has advantages of steady laser frequency output, high pixel consolution CCD, quick signal collection, and high precision of temperature control et al. A software system used for the data collection, in-situ scattering pattern display and analysis was developed.

And the miscibility and the development of the morphologies of polymer blends were studied under shear field with the instrument above-mentioned.

3. Effect of nanoparticles on the morphology of immiscible polymer blends

The morphological formation and stability of immiscible polymer blends in the presence of nanoparticles has been exploited by using optical-shear technique. It has been demonstrated that the change in the viscoelasticity of blends after incorporating nanoparticles plays a dominated role in controlling the structural dynamics of blends both in the quiescent and shear conditions. However, relevant theoretical models are still valid in describing the morphology-rheology relationship in these blends.

4. Study on the morphology and mechanical properties of polymer blends in micro-injection moulding

The results suggested that for micro injection moulding samples, the morphologies of PP/PS blends are very different from that made with conventional injection moulding.

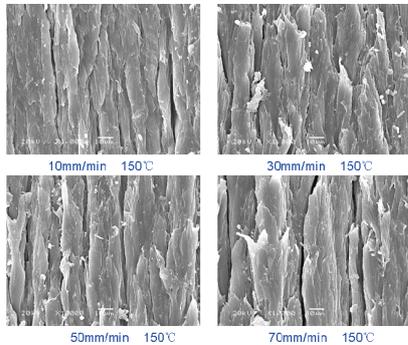
Topics in which you would like to develop collaborative research:

1. Morphology and mechanical properties of polymer blends in micro injection moulding
2. Morphology and mechanical properties of polymer blends in solid phase processing

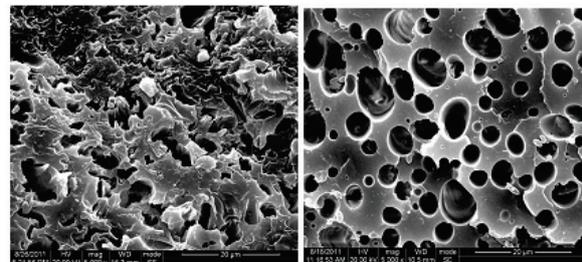
Relevant existing collaborations (academic/clinical/commercial) inside or outside China.

1. VIP PS-2008 conference (Bradford University, UK 2008.9.14-2008.9.23)
2. Science Bridges China (Bradford University, UK 2009.2.1-2009.2.12)
3. Academic Visiting in Bradford University, UK 2011.4-2012.2

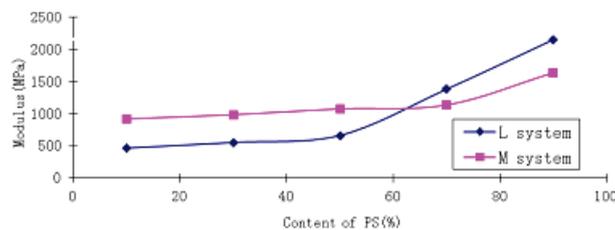
Relevant graphics, figures, pictures:



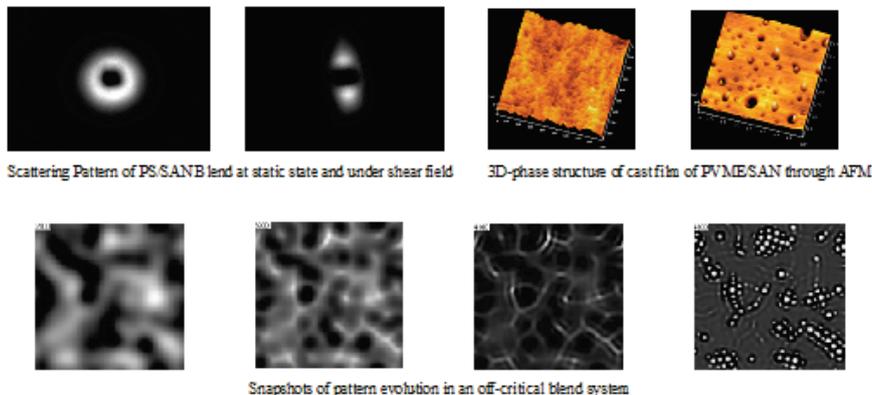
SEM of the fracture surfaces of PP/PS blends after die drawing etched by toluene



M-sample(PP/PS-50/50) ×5000 L-sample(PP/PS-50/50) ×5000
morphology of PP/PS blends of conventional moulding and micro moulding sample



modulus of PP/PS blends of L-sample and M-sample



Publications and other outputs relevant to your interest in this programme

1. Qi Yang, Yinghong Chen, B Whiteside, P D Coates, Study on the morphology and mechanical properties of PP/PS blends in micro-injection moulding, Polymer Processing Engineering 11, 6~7th December, 2011, University of Bradford, Bradford, UK, oral presentation.
2. Yinghong Chen, Mike Martyn, Ben Whiteside, Qi Yang, Qi Wang, Phil Coates, The Evolution in the Structure and Performance of Polypropylene/Clay Nanocomposite under Micro Injection Moulding Conditions, Polymer Processing Engineering 11, 6~7th December, 2011, University of Bradford, Bradford, UK, oral presentation.
3. Liping Li, Yajiang Huang, Qi Yang. Effect of Polydispersity on the Phase Behavior of Polystyrene(PS)/Poly(Vinyl Methyl Ether)(PVME), Journal of Macromolecular Science, Part B: Physics, 2011, 50: 2140-2149
4. Miqui Kong, Yajiang Huang, Guangling Chen, Qi Yang, Guangxian Li. Retarded relaxation and breakup of deformed PA6 droplets filled with nanosilica in PS matrix during annealing, Polymer, 2011, 52:5231-5236
5. Tong W, Huang Y, Liu C, Chen X, Yang Q, Li G, *The morphology of immiscible PDMS/PIB blends filled with silica nanoparticles under shear flow*. Colloid & Polymer Science, **2010**, 288: 753-760
6. Preparation and properties of fragrant acrylonitrile-butadiene-styrene composites. Liu, Xiaolin; Yang, Qi; Jiang, Zhiqiang; Feng, Decai; Li, Guangxian. Polymer - Plastics Technology and Engineering, v 48, n 3, p 227-231, 2009
7. Yang, Kun; Yang, Qi; Li, Guangxian; Kuang, Junjie; Jiang, Ziqiang. Mechanical properties and morphologies of polypropylene with different sizes of glass bead particles, Polymer Composites, 2008, 29(9):992-997