Highly structured polymer nanocomposites

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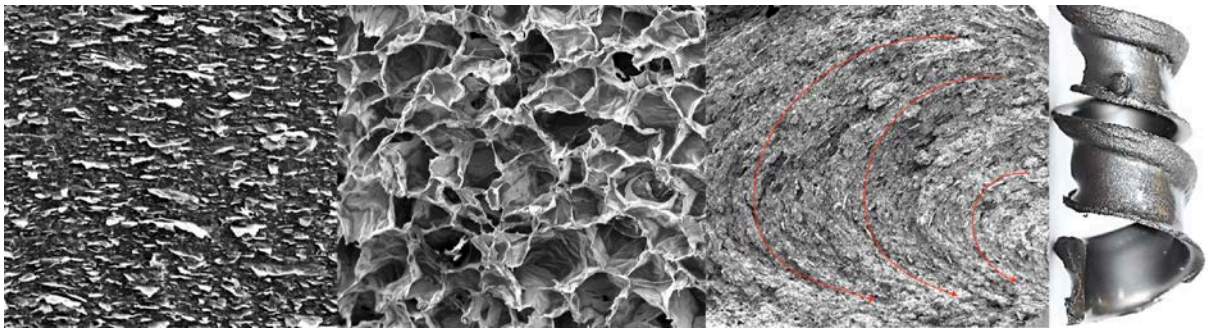

Fig. 1: Various morphologies obtainable via processing.

What is it? Controlling the flow – field filler interaction in polymer nanocomposites

Why does it matter? Filled polymer systems remain essential for improving and/or inducing new functional properties otherwise unavailable in plastics, i.e. mechanical, electrical, thermal etc.. A critical stage therefore is tailoring the nanocomposites morphology via processing. In the case of 2D nanofillers, due to their anisotropic, understanding their flow behavior is crucial for revealing their potential to lead towards multifunctional polymer nanocomposites. In addition to flow properties, nanofillers properties as well as the polymer molecular properties are also of utmost importance.

How does it work? We investigated a broad range of flow conditions from rheometric to processing flows, molecular topologies and various nanofillers, with a particular focus on graphene and graphite nanoplatelets. We relate the conditions fo a broad range of properties, including electrical, thermal, mechanical and gas barrier, especially in relation to highly structured morphologies. This led to a novel ideas for applications of polymer nanocomposites.

Publications

Gaska K., Xu X., Gubanski S., Kádár R., *Electrical, Mechanical, and Thermal Properties of LDPE Graphene Nanoplatelets Composites Produced by Means of Melt Extrusion Process*, **Polymers** (Switzerland) 9(11), 294 (2017)

Kádár R., Abbasi M., Figuli R., Rigdahl M., Wilhelm M., *Linear and Nonlinear Rheology Combined with Dielectric Spectroscopy of Hybrid Polymer Nanocomposites for Semiconductive Applications*, **Nanomaterials** 7, 2 (2017)

Media coverage

Article on of the above for packaging applications:
Grafen vässar svenska produkter, Kemivärlden Biotech med Kemisk Tidskrift Nr. 8 December 2017