



**GENERATION OF ADVANCED MULTIPHASE POLYMER MATERIALS VIA ELECTRON INDUCED
REACTIVE COMPOUNDING**

U. Wagenknecht, U. Gohs, S. Roj, K. Naskar, V. Thakur, G. Heinrich
Leibniz Institute of Polymer Research Dresden, Germany

Reactive processing of polymer compounds and blends combines melt mixing process and chemical reaction. A new technique of direct generation of polymer radicals during the mixing process using high energy electrons was developed.

The advantages and limitations of this process will be shown on examples of a variety of filled polymers and reactive blends.

A continuously laboratory kneader was combined with an electron accelerator and the polymer radicals were generated in a limited polymer volume between the kneading paddles. Simultaneously parts of the reactive volume were incorporated in the whole kneading volume and well distributed.

This technique provides unusual polymer composite structures and properties like relatively strong bonding between matrix and filler for particulate fillers and very wide particle diameter distribution including particles smaller 30nm of disperse phase for reactive blends. The morphologies of such materials will be illustrated and selected resulting properties will be shown.

An general outlook of the potential of this new technique will be given.