OP-6-300

Thursday, May 12, 2011, 11:10-11:30 am
Room: Karam 1

MODELING THE INTERFACE TEMPERATURE DEVELOPMENT AND THE RESULTING ADHESION MECHANISMS AT MULTI-COMPONENT INJECTION MOLDING

Rainer Kleeschulte, Elmar Moritzer,

KTP, University of Paderborn

rainer.kleeschulte@ktp.upb.de

Polymer compound injection molding is today state-of-the-art to generate hard-soft combinations ofpolymers. In various industry branches this technology is used to manufacture function-based hard-soft component parts. Many examples from automobile, medical devices, white goods as well as the toy industry are well known and penetrate the market. The binding mechanisms of selected hard-soft combinations are often based on deliberately implemented constructive undercuts. These lead to a positive connection after cooling. In addition, certain pairings show a high adhesion affinity towards each other so that an adhesion mechanism occurs. With some pairings the adhesion (like that of an adhesive strip) can be separated without residue. With others this is not the case and thus a more intensive binding process of the hard and the soft component has to be assumed. It seems that diffusion processes occur in the interface between them. However, this process is only possible under one condition. The temperature in the contact plane of macromolecule chains can change places. In this paper the contact temperature developing over time is described with the help of a modeling. It shows that adhesion on the basis of interface diffusion is possible.