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CONDUCTIVITY OF MELT SPUN PMMA COMPOSITES WITH ALIGNED CARBON FIBERS: REVEALING A MASTER CURVE

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The conductivity and morphology of melt-spun PMMA/carbon fiber (CF) composites have been investigated and analyzed. Using a two-step melt mixing procedure, CF aspect ratios of 6.3, 9.2 and 12.0 were achieved. Composite fibers with different CFs concentrations were melt spun using a capillary rheometer, and the morphologies of both the surface and the cross-section were observed and discussed. The conductivity of composite fibers at room temperature was fitted with the McLachlan GEM equation and Balberg excluded volume theory. The percolation threshold as well as the relationship between the percolation behavior and the aspect ratio were determined, taking into account additionally the CF orientation, our data and all available data from the literature were transferred to a master curve for the first time.

Biography

Dirk W Schubert has completed his PhD in 1996 at the Max-Planck-Institute for polymer research and Post-doctoral studies at Helmholtz-Centre Geesthacht. He has ten years experiences in industry and he is currently, the Head of Department for polymer materials at Friedrich-Alexander-University Erlangen-Nuremberg. He has published more than 200 papers in reputed journals.

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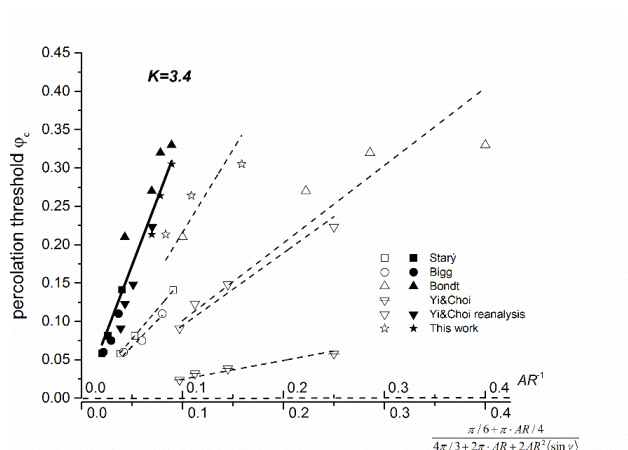


Figure.1. Hollow symbols only consider the aspect ratio while filled symbols are the data taking both aspect ratio and orientation into account