

Monitoring of Nanostructure Response on Mechanical Tests in Oriented Nanocomposites

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Extruded nanocomposites based on polyolefines are monitored during mechanical fatigue tests by two-dimensional small-angle X-ray scattering. Nanostructure parameters are evaluated. The local macroscopic strain at the point of irradiation is determined. The nanostructure evolution is demonstrated in movies. Macroscopic and nanoscopic structure parameters are evaluated by newly developed automated data evaluation methods that are adapted both to the study of thermoplastic materials that fail at rather low strains, and to the voluminous data series that are generated at modern synchrotron radiation sources. Results from recent studies are used to demonstrate the power of the method.

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