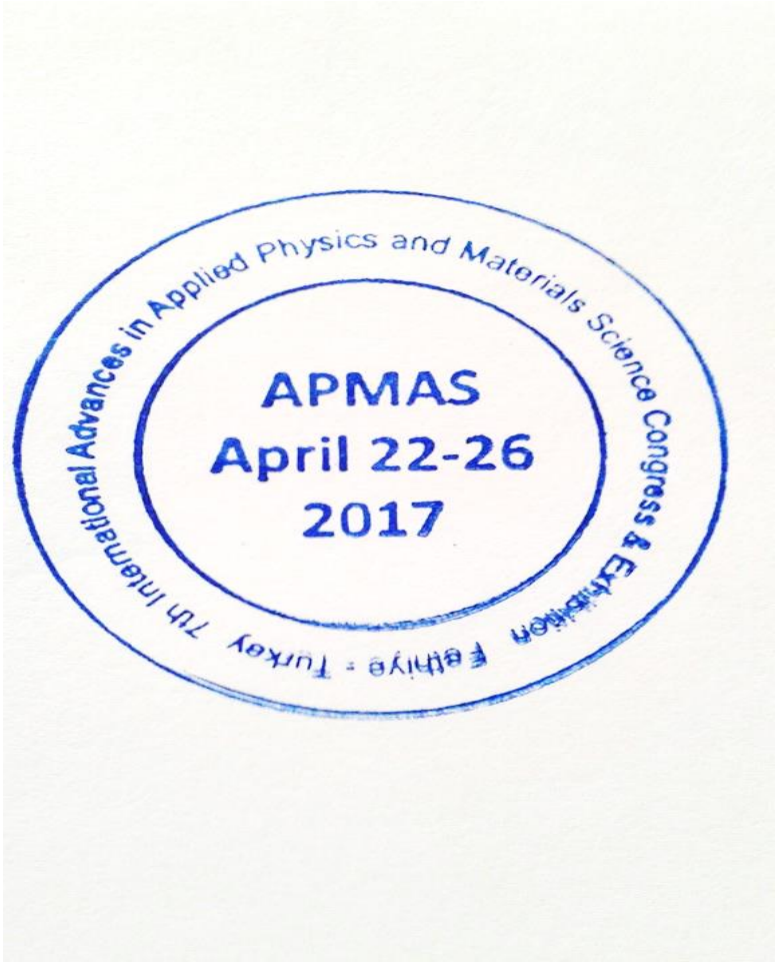
Book of Abstracts

APMAS 2017



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(APMAS 2017)

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REGULAR SESSIONS

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The Investigation of Short-Term Creep Behavior of Microparticulate Filled Polypropylene Materials

S. SAHIN[1], B. AYDEMIR[2], T. SAHIN[1,*]

[1] *Kocaeli University, Machine Engineering Department, İzmit, Turkey*

[2] *TUBITAK UME, P.K.54, 41470, Gebze, Kocaeli, TURKEY,*

E-mail: tulsah@kocaeli.edu.tr

Abstract:

The design engineer of plastic component parts needs more than just short-term stress-strain data for anticipating long term deformation behavior. For example, the useful service lifetime of the molded part is curtailed by onset of excessive creep deformation, leading to ultimate creep rupture. Consequently, there have been significant efforts by researchers to correlate creep strain with stres-tempeature-time parameters that suit end-use constraints imposed on material design. The aim of this study is to observe the mechanical behaviors of calcium carbonate in mineral filler in polypropylene (PP) material under uniaxial tension loading. The specimens are prepared to consist of 5%, 10%, 15%, 17,5% and 20% calcium carbonate in PP materials. The tests are conducted in two steps. Firstly, loading and unloading tensile tests are performed at E-3 1/s strain rates to characterize the mechanical properties. Secondly, the relaxation behavior of materials is determined through tensile tests at different stress levels. As a result of this study, the effects on relaxation behavior of the stress level and mineral filler ratios of specimens were determined. The strain levels were found to increase as stress levels rose. Additionally, As the amount of $CaCO_3$ increases, the energy level decreases.

Keywords: Polypropylene (PP), Mechanical behavior, Calcium carbonate, Creep.

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