

## Supplementary Material

We carried out strain sweep experiments (in Q800 DMA machine from TA Instruments) at a fixed frequency of 1 Hz and at the temperatures 0, 20, 60 and 120°C. Figure 1 and 2 shows strain sweeps of the filled NBR and FKM compounds.

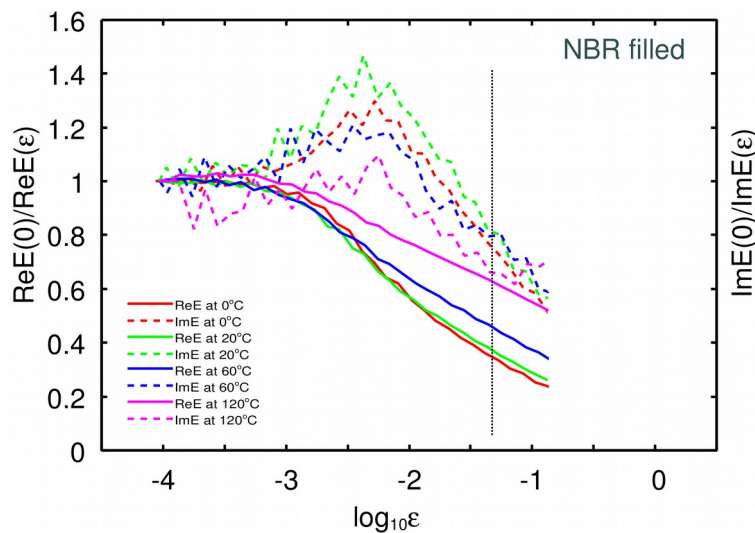


Figure.1. Strain sweep of filled NBR rubber compound at 0, 20, 60 and 120°C. The vertical dashed lines show the typical strain value at velocities where the rolling friction is maximal.

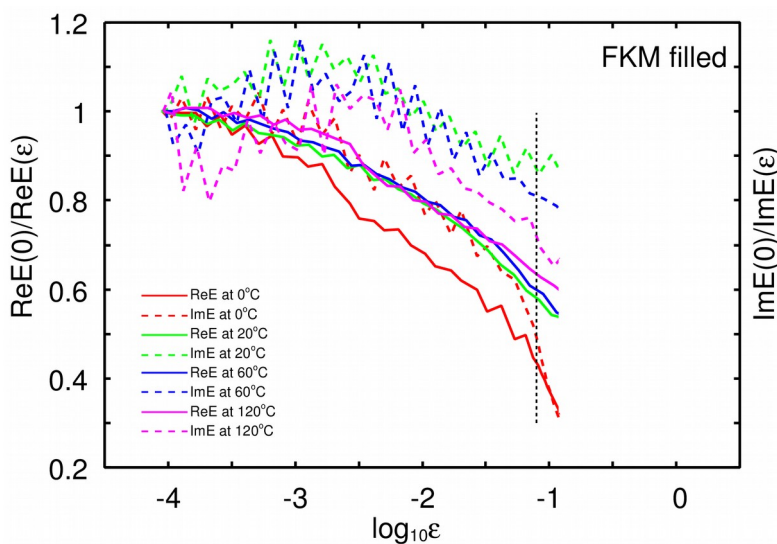


Figure.2. Strain sweep of filled FKM rubber compound at 0, 20, 60 and 120°C. The vertical dashed lines show the typical strain value at velocities where the rolling friction is maximal.