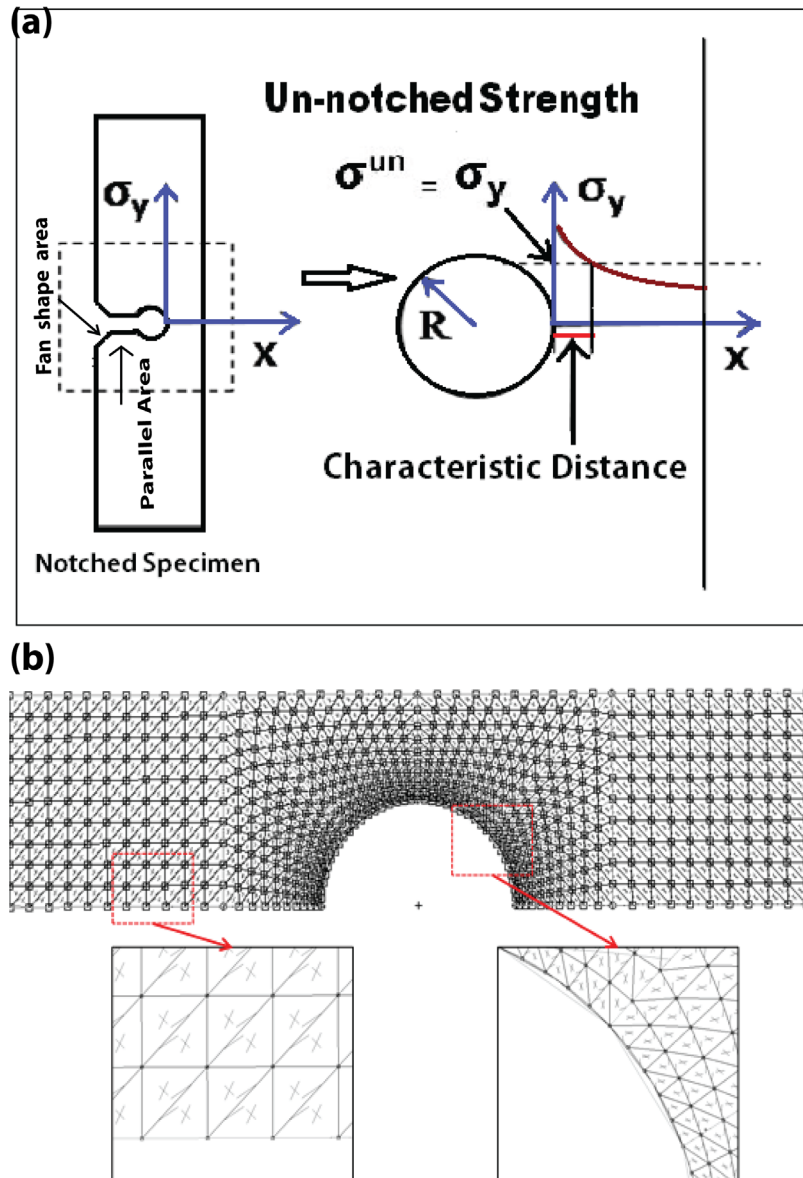
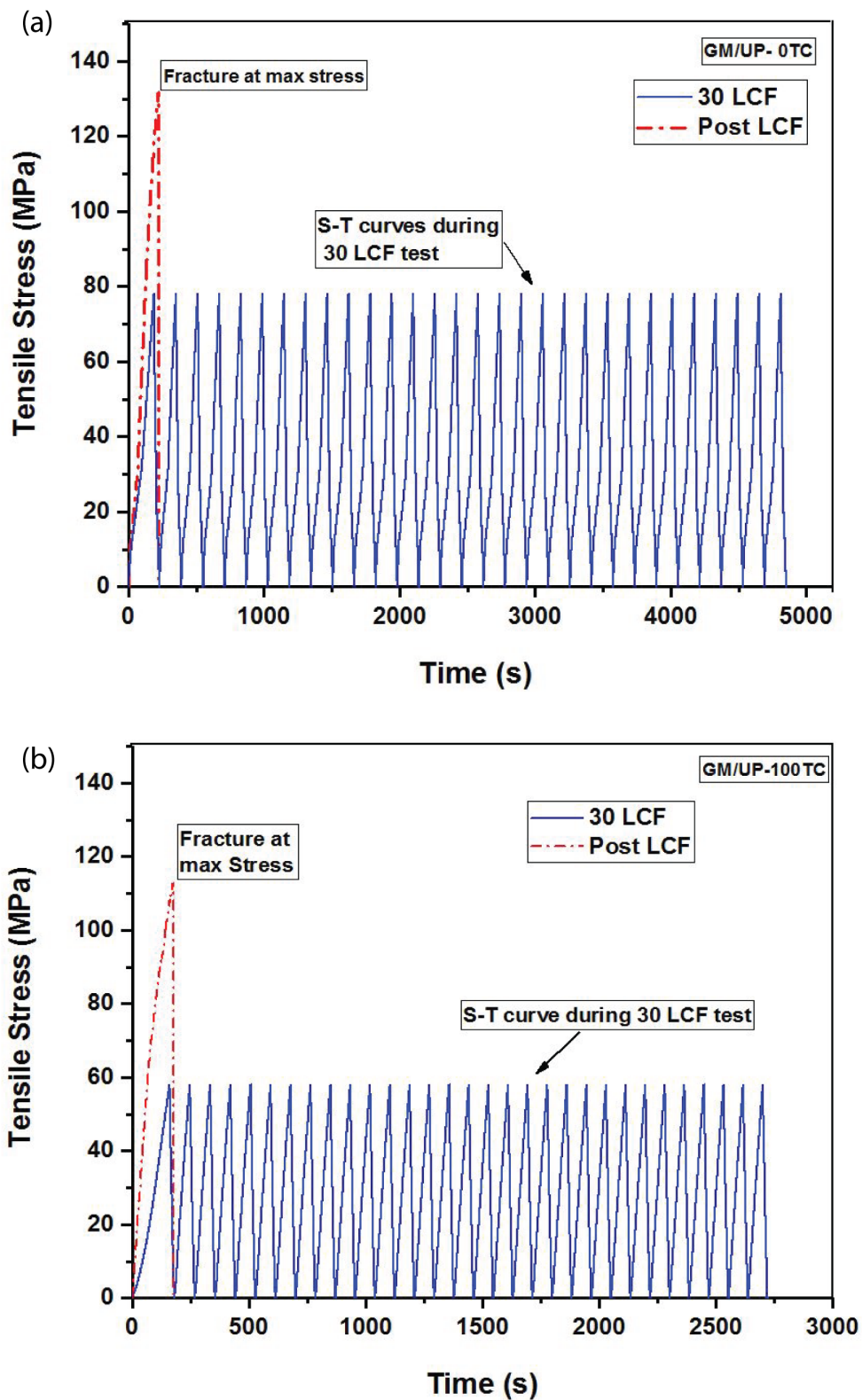


# **Durability and notch sensitivity analysis of environmental ageing induced Glass fibre mat and Kenaf fibre mat reinforced composites.**

Supplementary Section with Figure S1 to S7 and Supplementary note.



**Figure S1:** (a) Characteristic distance in a stretched notched specimen where un-notched strength touches notched strength ( $\sigma^{un} = \sigma^i = \sigma_y$ ). (b) 2D triangle meshing method of elements. This work followed a similar elements meshing method of previously accomplished study of Zhang et al. [28].

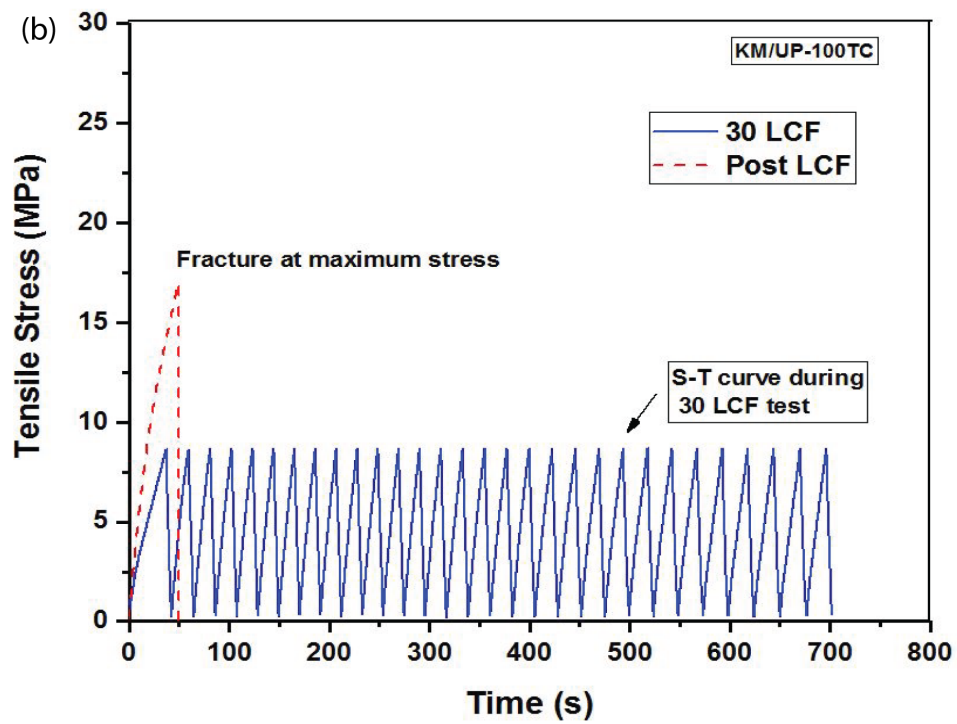
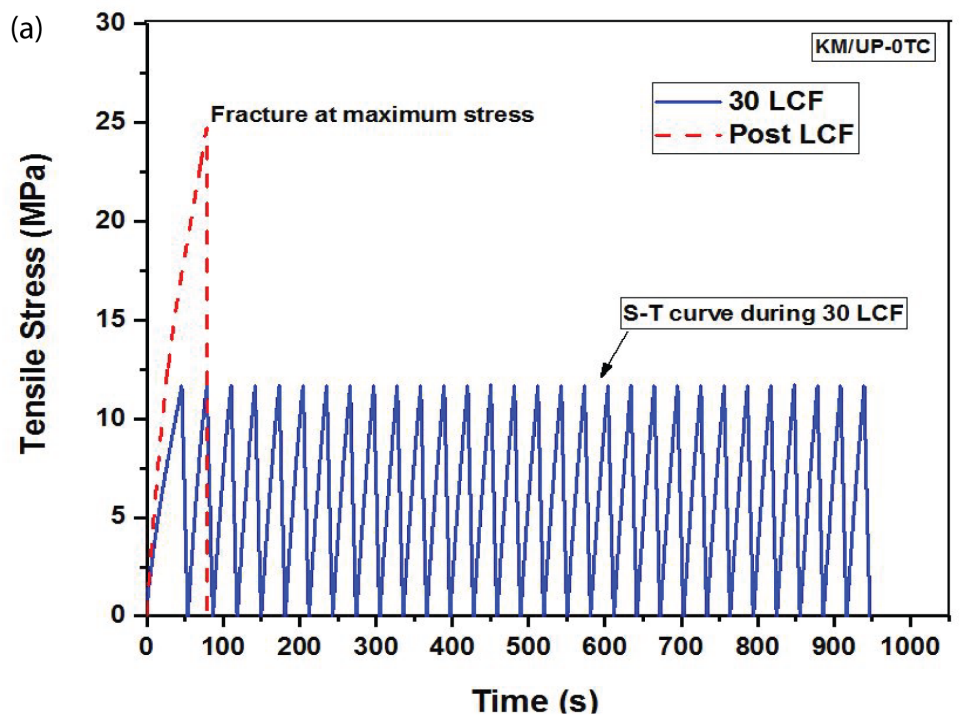


**Figure S2:** Tensile Stress–Time curve during and after 30 LCF for GM/UP at (a) Pre-Thermal ageing and (b) Post-Thermal ageing.

**Supplementary note:**

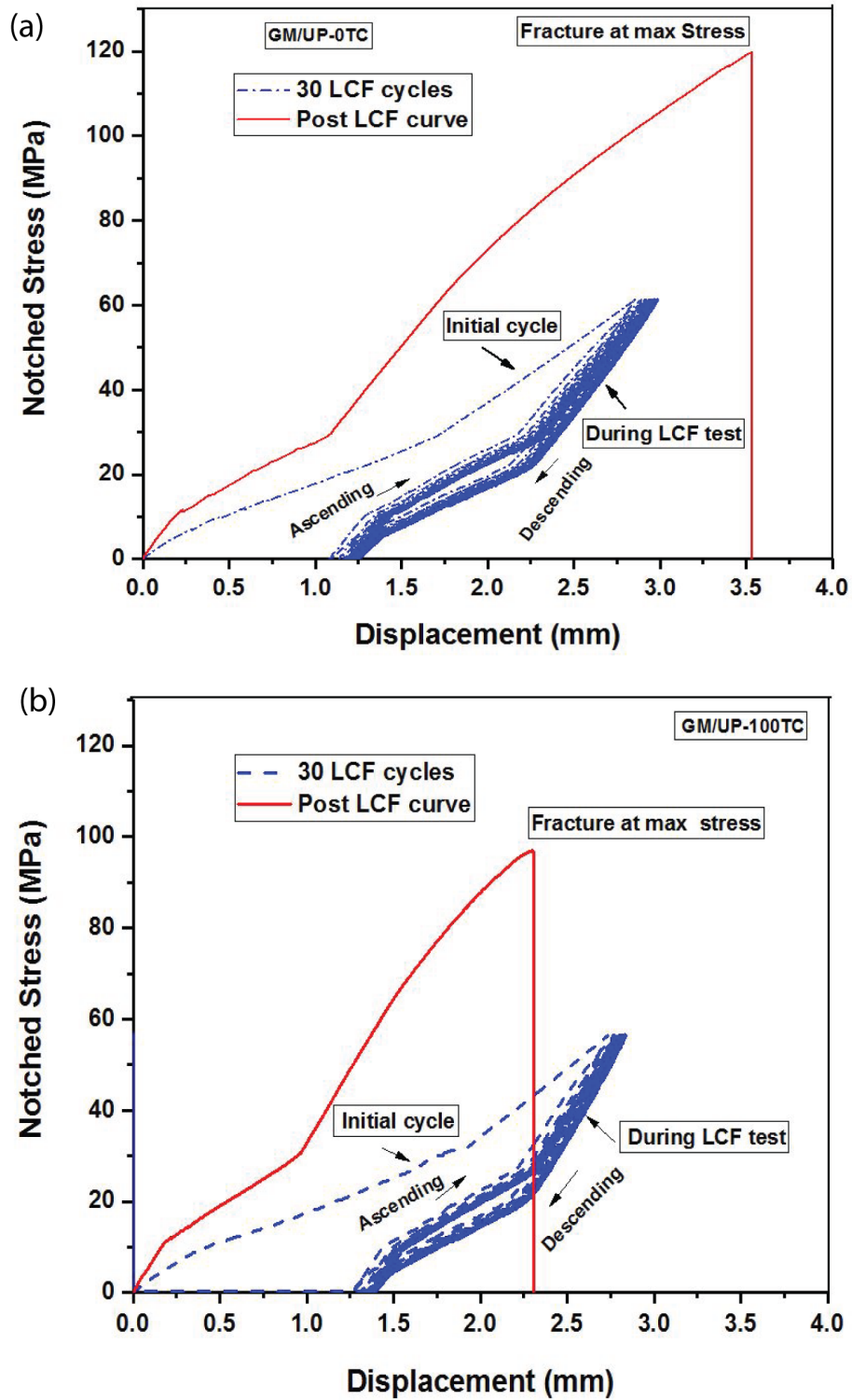
At 100 thermal cycle (100TC) condition, the 30 LCF test duration was almost only half of the duration of that at pre-thermal ageing (0TC) condition for GM/UP (Figure S2). The stress curve of post-LCF fracture at 100TC showed very little difference from the initial stress-time curve of 30 LCF test.

In Figure S3, at 100 thermal cycles (100TC) condition, the 30 LCF test duration was nearly two-third of the duration of that at pre-thermal ageing (0TC) condition for KM/UP. The stress curve of post-LCF fracture at 100TC showed very little difference from the initial stress-time curve of 30 LCF test. The only 30 cycles of LCF with 50-55% preset load could not make a significant consequence for both of the composites at 100 cycles of thermal ageing in case of un-notched specimens.



**Figure S3:** Tensile Stress–Time curve during and after 30 LCF for KM/UP at (a) Pre-Thermal ageing and (b) Post-Thermal ageing.



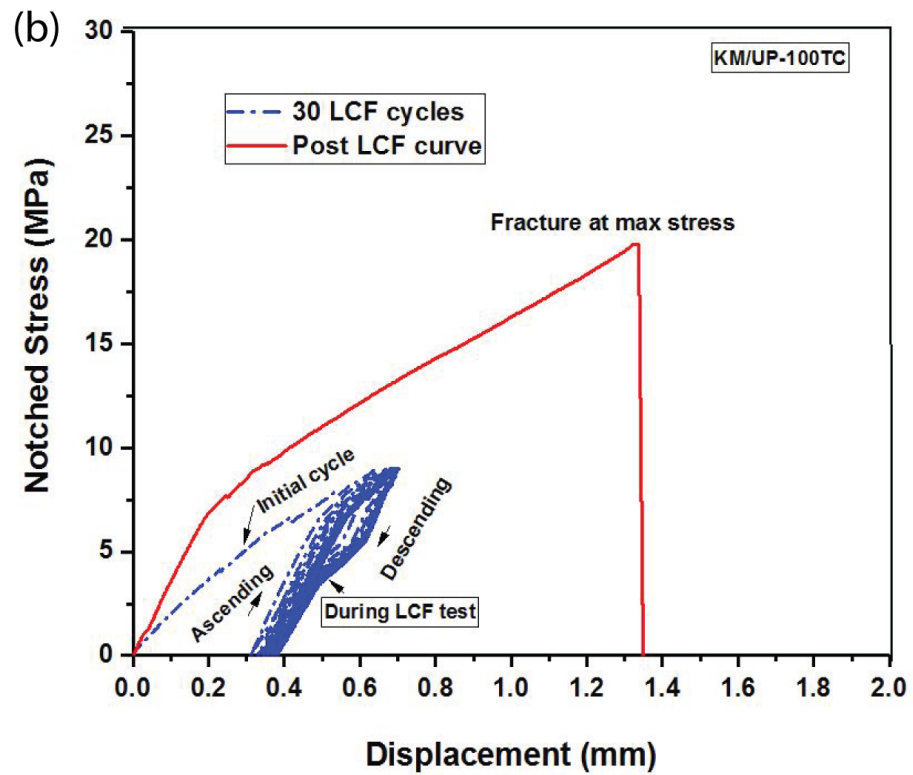
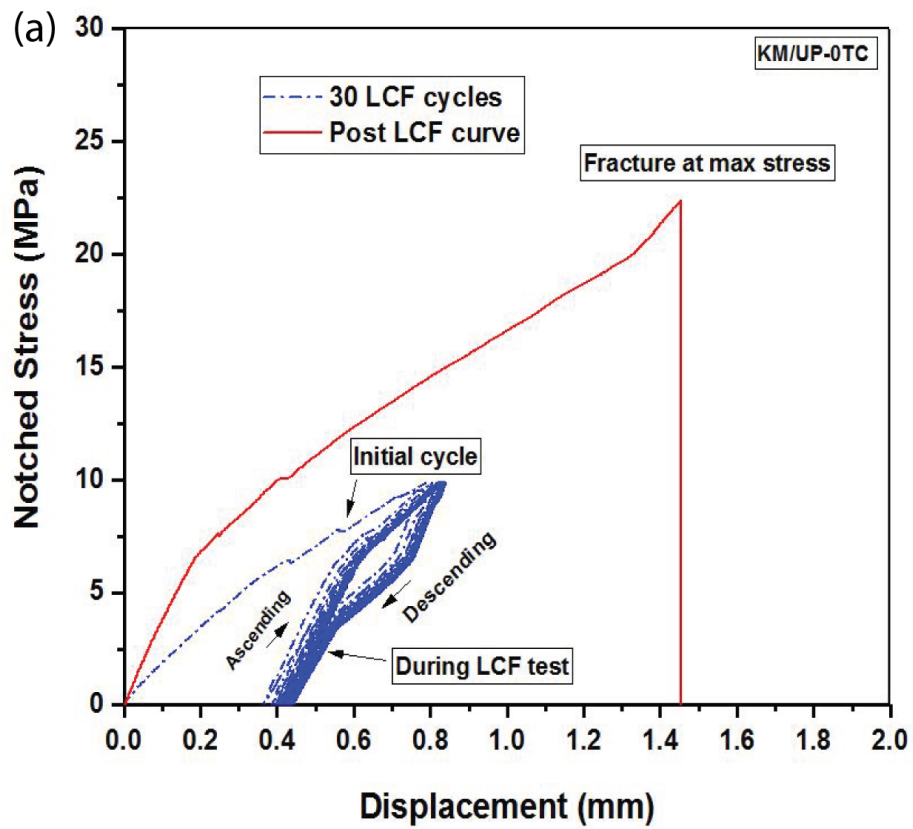


**Figure S4:** Notched Stress–Displacement curve during and after 30 LCF for GM/UP at (a) Pre-Thermal ageing and (b) Post-Thermal ageing.

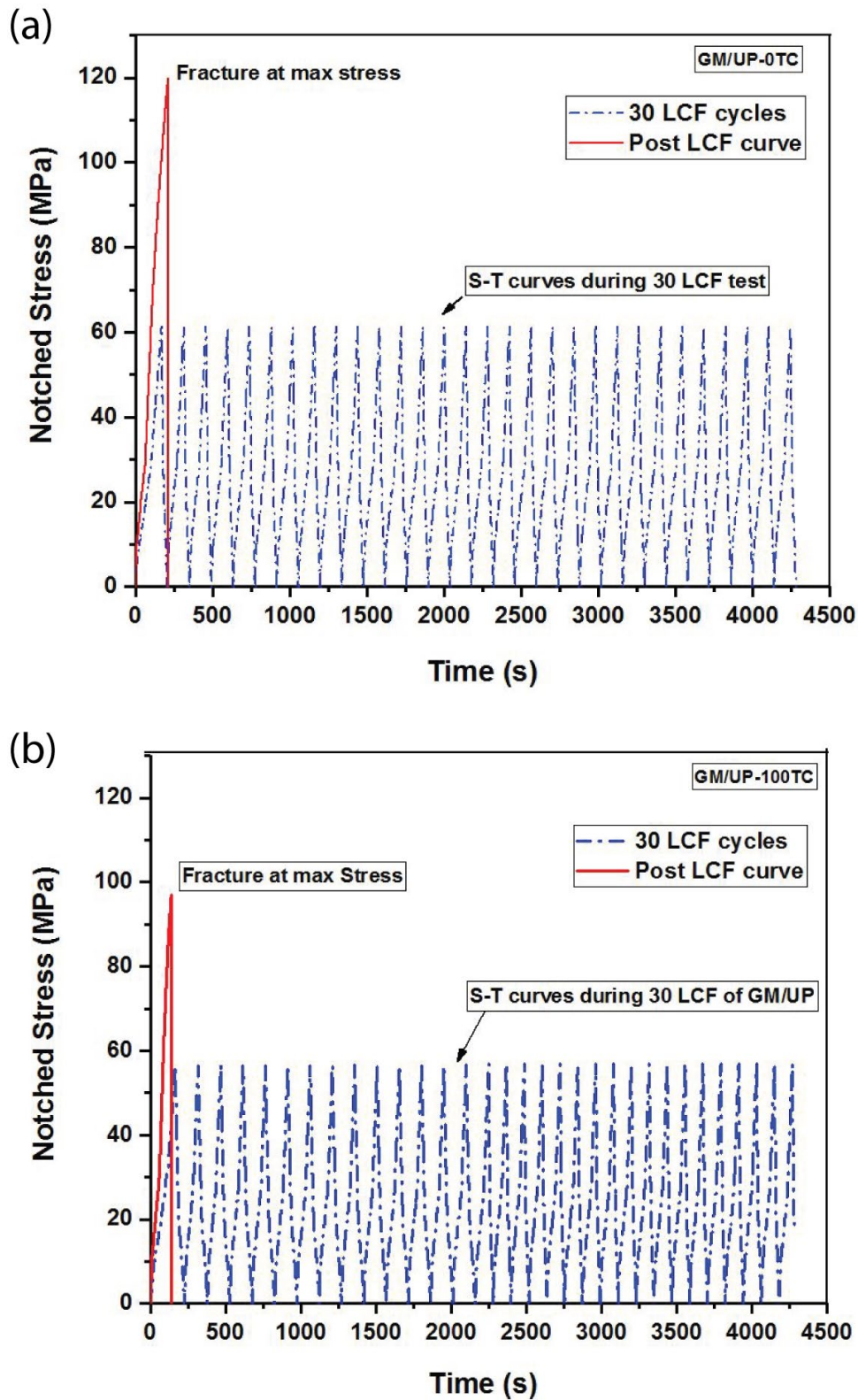
In Figure S4, the notched stress-displacement curve of GM/UP during and

after the 30 LCF cycles showed the similar fashion with only an exception in the displacement of the post-LCF notched stress curve at the different thermal ageing condition. The initial cycle is quite different from any other LCF cycles; the unrecoverable displacement happens due to the preset load; the other cycles follow the preceding displacement during the LCF test. The stretching or displacement of fracture is shortened after the LCF at 100TC specimen.

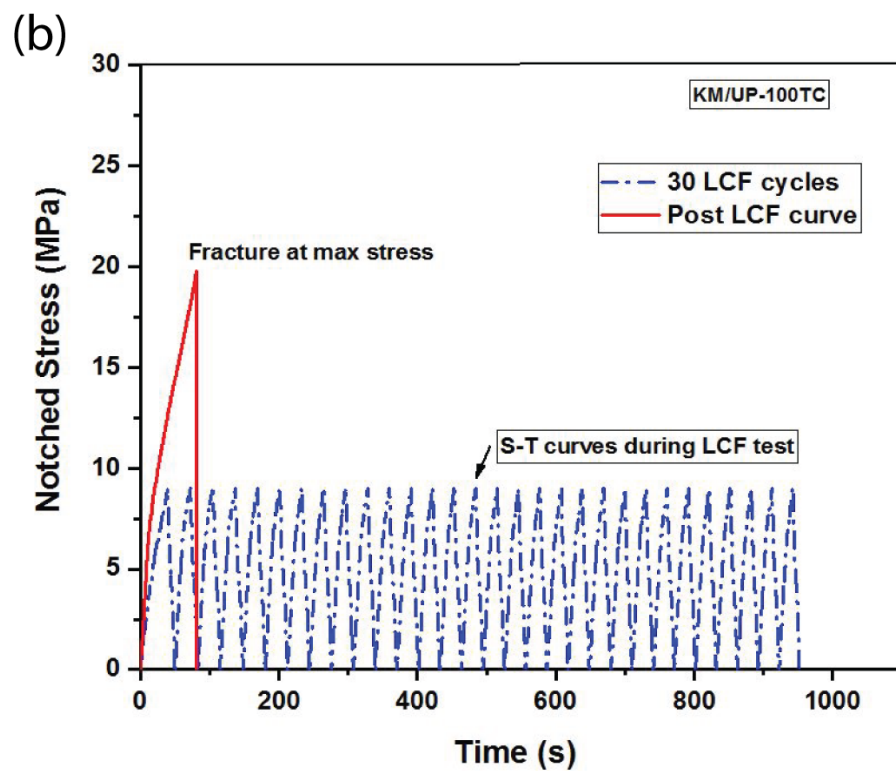
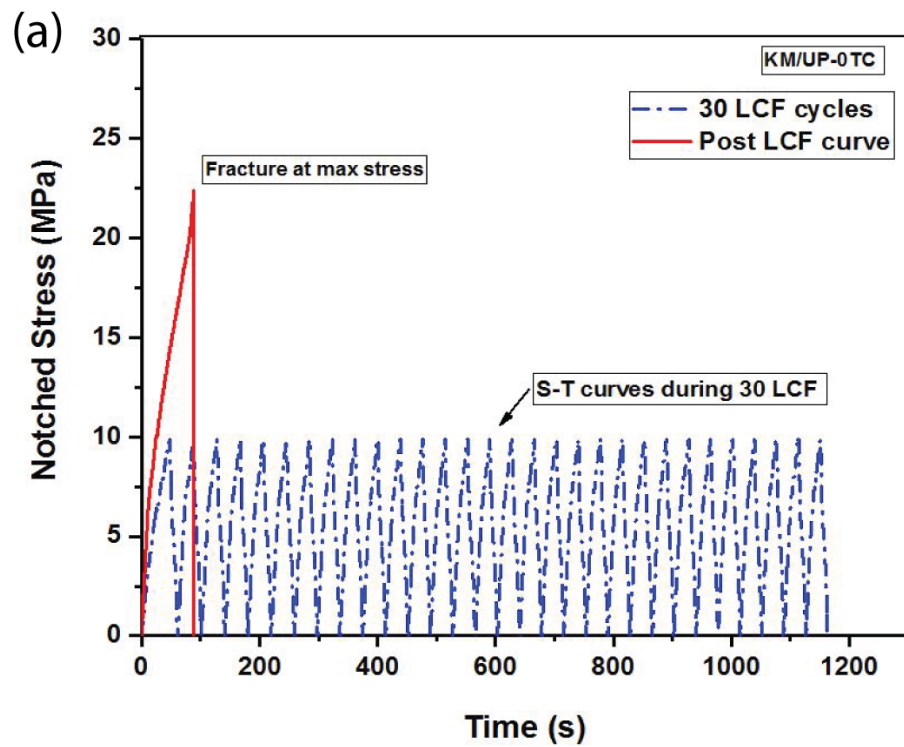
The notched stress-displacement curve of KM/UP during and after the 30 LCF cycles showed almost a similar pattern at different thermal ageing condition (Figure S5). The initial cycle is also quite different than any other LCF cycles; the unrecoverable displacement happens as the preset load exceeds the elastic limit of load; the other cycles follow the preceding displacement during the LCF test. The only difference between the notched stress-displacement curves during the LCF test of GM/UP and KM/UP is the position of the apparent non-elastic stress-displacement region. For GM/UP, it is placed at the bottom, and for KM/UP it is on the top region. In case of GM/UP, most of the stretched glass fibers reaches the elongation at break probably at the middle to the ending of the total fracture duration. During the LCF test, when the load reaches near the highest preset load in each cycle, the specimen experiences the proportionate stress with displacement. In case of KM/UP, most of the fibers experience the proportionate stress with displacement at the beginning of the loading probably due to the lower elongation at break and lower durability.



**Figure S5:** Notched Stress–Displacement curve during and after 30 LCF for KM/UP at (a) Pre-Thermal ageing and (b) Post-Thermal ageing.



**Figure S6:** Notched Stress–Time curve during and after 30 LCF for GM/UP at (a) Pre-Thermal ageing and (b) Post-Thermal ageing. At different thermal ageing condition, the LCF tests of GM/UP took almost similar duration.



**Figure S7:** Notched Stress–Time curve during and after 30 LCF for KM/UP at (a) Pre-Thermal ageing and (b) Post-Thermal ageing. At different thermal ageing condition, LCF tests of KM/UP spent the almost similar duration.