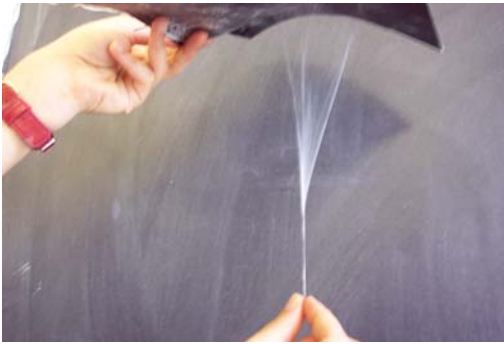


# NANO ENGINEERED FIRE RESISTANT COMPOSITE FIBERS---M02-D08

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## Nanofiber Manufacturing



### 1. Modeling

We assumed a fiber and embedded nano sized particle inside. The size of the particle was taken more than 200 nm. In order to avoid quantum effect on modeling, the size of the models was taken more than the critical mean path which can differ also according to material properties. The modeling steps were taken as shown in Figure 1.

We thought about first a single fiber and tried to put the fillers as a ratio of 4-5%. If we demonstrate it, we can get a symmetry line both radius or diameter length. Below, the symmetry was taken from the radius. The modeling steps, changes in the developing process. Firstly, we put a fiber put, we tied to use the symmetry from both the frontal direction and the longitudinal section.

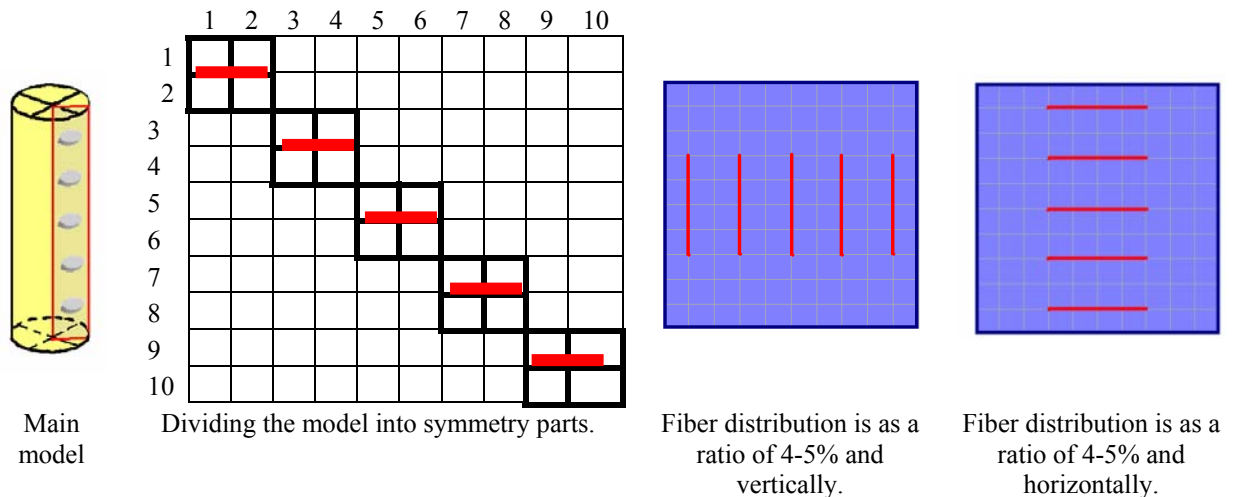
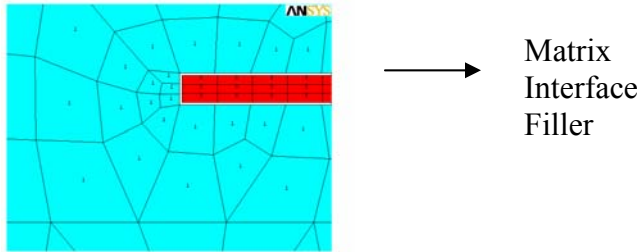


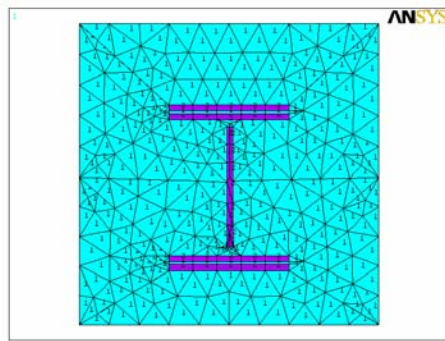
Figure 1. Modeling steps.

Figure 2 shows the model for the interface:



**Figure 2. Interface part.**

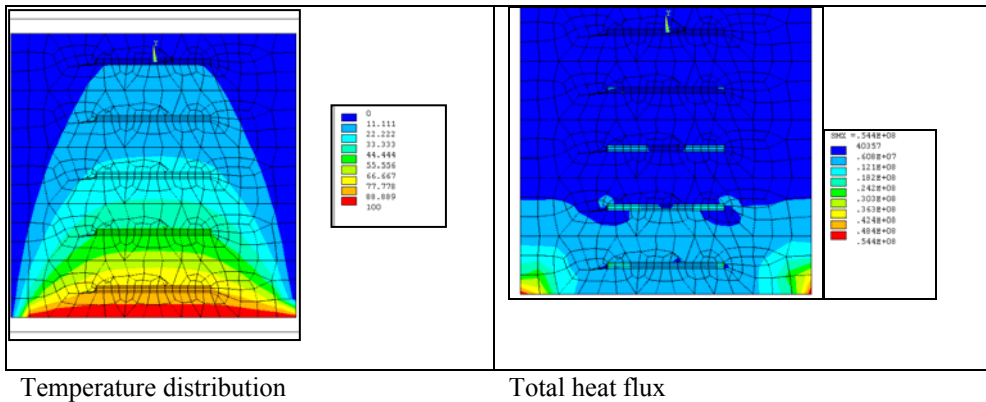
Figure 3 shows a model in which different fillers were embedded.



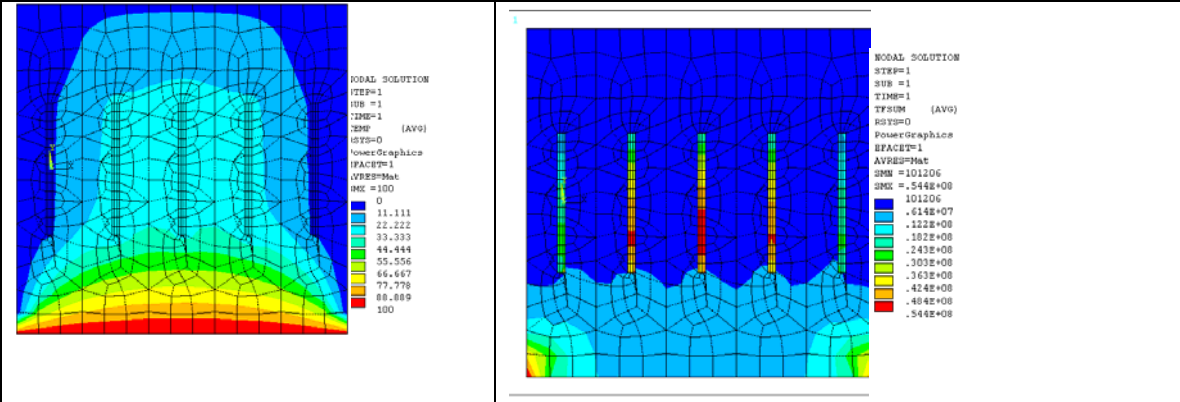
**Figure 3. Random placed fillers.**

## 2. Results:

The same boundary conditions were applied in all cases. We examined the difference between different filler distributions. As a boundary condition, to show the symmetry inside the models, the model was restricted. The top was 10 °C and the bottom was 100 °C. The results are shown in Figures 4 and 5.



**Figure 4. For horizontally embedded fiber distribution (1<sup>st</sup> model)**



Temperature distribution

Total heat flux

Figure 5. For horizontally embedded fiber distribution (2<sup>nd</sup> model)