**Final Simulation**

*We may have 2 final simulations to compare the lamellar structure to the globular structure.*

**What we have gathered from each test case:**

From Test Case 1: Heat diffusion will occur in this model too from the LHS of the microstructure to the RHS.

From Test Case 2: The displacement map will also be included in this model (due to differences in thermal expansions). Maybe we will also look at the stresses produced in this simulation.

From Test Case 3: The colour maps/bars will be added into this final simulation. Will also use a microstructure similar to this.

From Test Case 4: Realised in this test case that there is no scale bar on the microstructural image. This will be included in this test case

**Input Parameters:**

**Material:**

|  |  |  |
| --- | --- | --- |
|  | **Alpha Phase** | **Beta Phase** |
| Young’s Modulus, E (GPa) | 92.8 | 75.8 |
| Poisson Ratio, ν | 0.35 | 0.31 |
| Thermal conductivity, W/mK | 7.6 | 11.3 |
| Thermal expansion, α (K-1) | 8.6e-6 | 11.8e-6 |

**Skeleton**: 40 x 40 quad (may include tri elements for greater accuracy but increased computational times)

**Homogeneity index**: (*learned that, from each test case, the closer to one this number is, the more accurate the simulation results as the mesh correctly represents the boundaries between each phase)*

**Temperature fields**: Looking at how temperature diffuses through the phases(defined, active and in-plane all included)

Displacement fields: Looking at how the microstructure deforms due to differences in thermal expansion (defined, active and in-plane all included)

**Equations included**: Heat Eqn, Force balance (maybe Plane stress?)

**Boundary conditions:**

LHS = 0 °C, RHS = 1000 °C

LHS will be fixed i.e. no displacement in the x,y directions on the LHS

**Tolerance**: 1e-13

**Iterations**: 1000

**Initializer**: T: 0.0, cx: 0.0, cy: 0.0