Supplementary Figures

**Supplementary Figure S1.** SEM images of the microstructure of the base material at: (a) low magnification and (b) high magnification

**Supplementary Figure S2.** EBSD characterization of the base material: (a) Low-resolution orientation (inverse-pole-figure) map, and (b) 0001 and 11-20 pole figures showing the texture. In (a), LABs and HABs are depicted as white and black lines, respectively.

**Supplementary Figure S3.** EBSD characterization of the base material: (a) High-resolution orientation (inverse-pole-figure) map, and (b) misorientation distribution. In (a), LABs and HABs are depicted as white and black lines, respectively. In (b), the insert in the top right corner shows misorientation-axis distribution.
Supplementary Figure S4. SEM micrograph taken from the stir zone which exemplifies several secondary-alpha colonies within a prior-\(\beta\) grain