Supporting Information

Phase stability and interface structure of nanoscale Si crystallite in Al-based alloys

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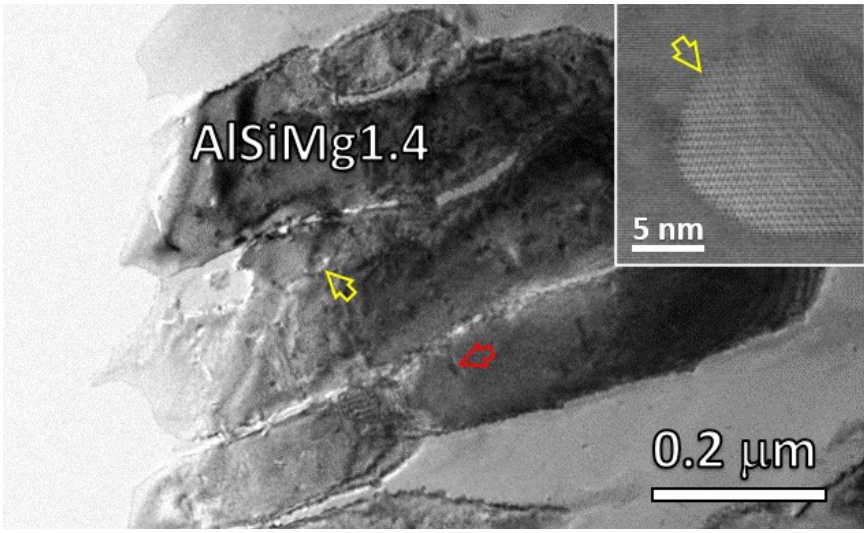

Figure S1. A low-magnification TEM image of Al-8.2Si-1.4Mg (wt. %) (AlSiMg1.4) sample. In the α-Al matrix, the nanoscale Si precipitates appear, as demonstrated by a red arrow. During our TEM/STEM observations, it was found the population of nanoscale Si precipitate is low. In addition, apart from nanoscale Si precipitates, the nanoscale precipitates with an unknown structure exist, as indicated by a yellow arrow. The HAADF-STEM image of such precipitates is inserted in the micrograph.

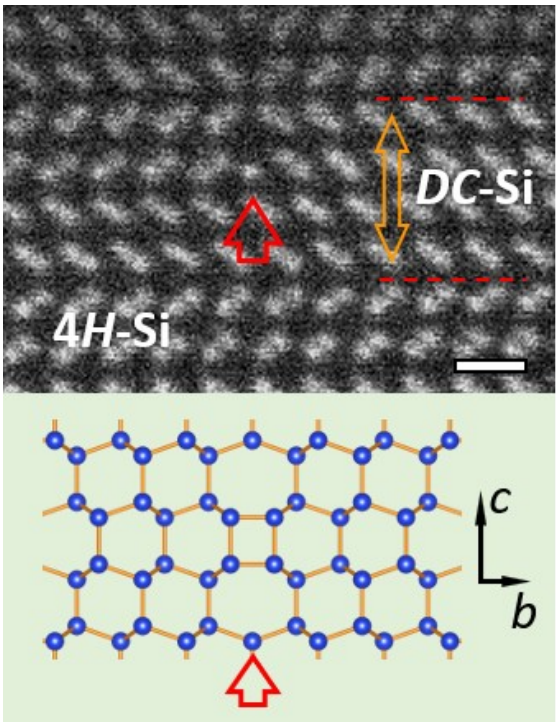

Figure S2. The HAADF-STEM image of the $(1\bar{1}00)[0001]_{4H\text{-Si}}$ twin and the corresponding structural model. The HAADF-STEM image (scale bar: 0.5 nm) is viewed along the $[11\bar{2}0]$ direction of 4*H*-Si. Within the 4*H*-Si matrix, the stacking sequence of the *DC*-Si structure appears, as shown by a double-head arrow, which results in the formation of $(1\bar{1}00)[0001]_{4H\text{-Si}}$ twin. At the twin boundary (TB), a structural unit of two seven-membered rings separated by one four-membered ring appears periodically, as shown by vertical red arrows.