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Abstract

By using the electron backscattered diffraction (EBSD) technique, pattern selection of twinned growth in Al-4.5 wt.% Cu alloy has been studied in Bridgman solidification experiments. Based on the original twin planes formed at 3000 $\mu\text{m/s}$, the twinned growth was produced till the end of solidification after abruptly decreasing the growth rate to 100, 50, 20, 10, 5, 3, 1 and 0.3 $\mu\text{m/s}$. The stable twinned growth could be achieved during a wide range of solidification process. For the first time, the so-called twinned cell pattern was observed and prevailed in the solidified structure at 3 and less than 3 $\mu\text{m/s}$. The twinned growth in aluminum alloy was not limited to dendrite pattern as has previously been reported. The twinned pattern selection map was also revealed. Meanwhile, an interesting orientation rotation phenomenon was elucidated using EBSD technique on both sides of the coherent twin boundary during twinned cell growth. At a lower rate of 0.3 $\mu\text{m/s}$, the orientation rotation deflection concerning the original $\Sigma 3$ 60° twinning relation was confirmed. Some coincidence

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