

Supplemental Materials

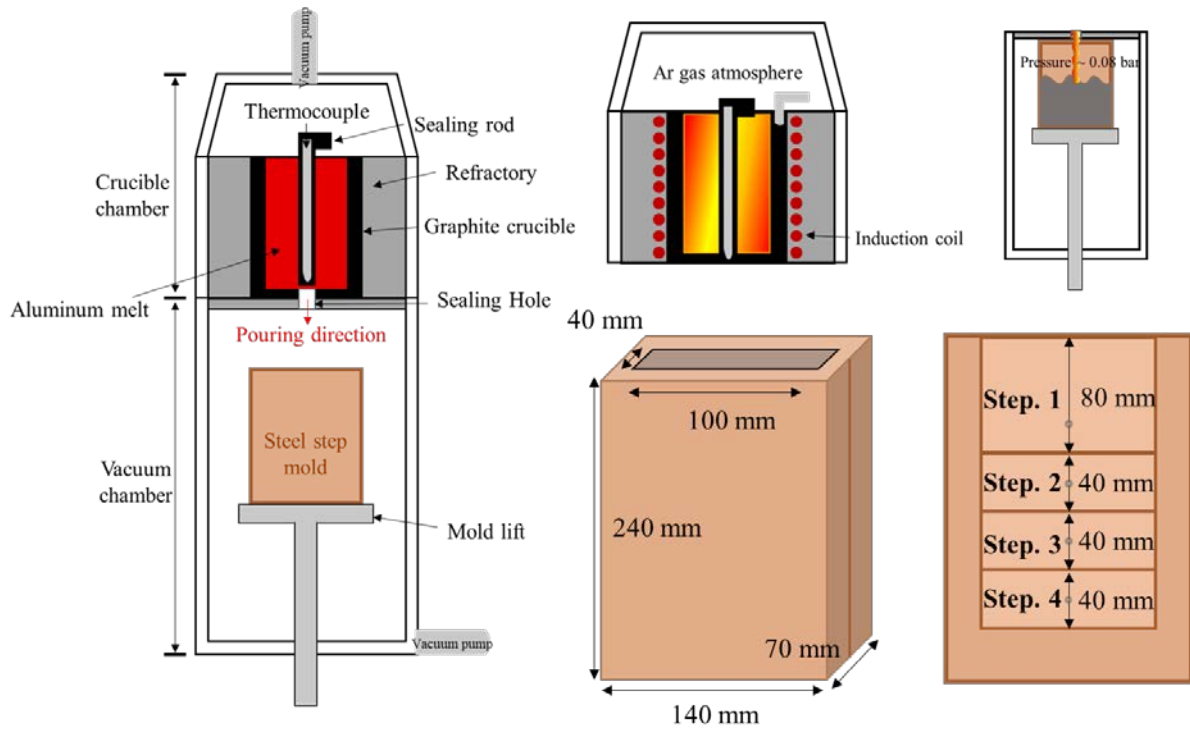


Fig. S1. Schematic illustration of a casting equipment and a step mold used for Al-18Si-xNi casting in the present study

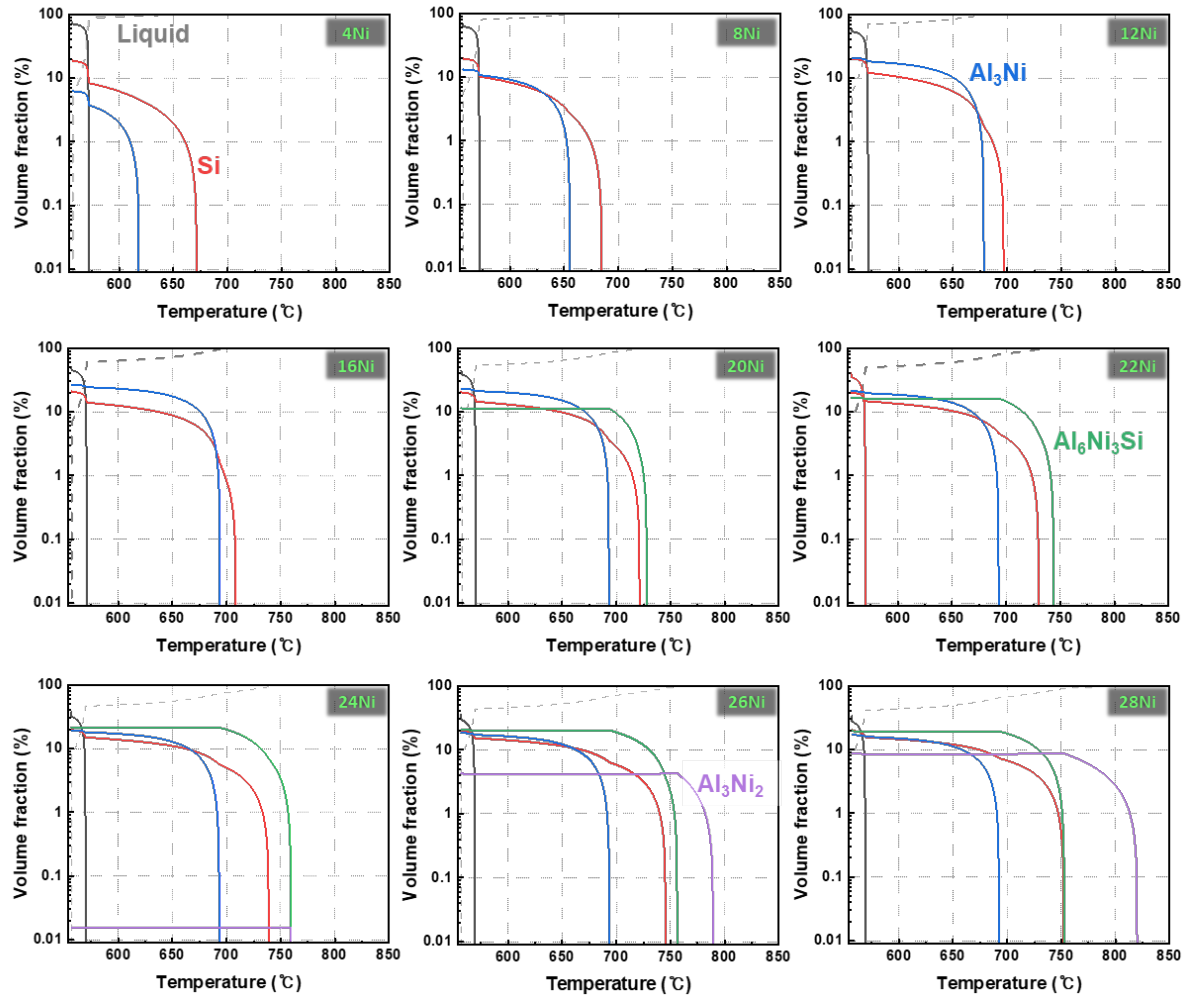


Fig. S2. Scheil simulations predicting the solidification sequence of Al-18Si-xNi alloys in the early stage of solidification using Thermo-Calc with TCAL8 database [30].

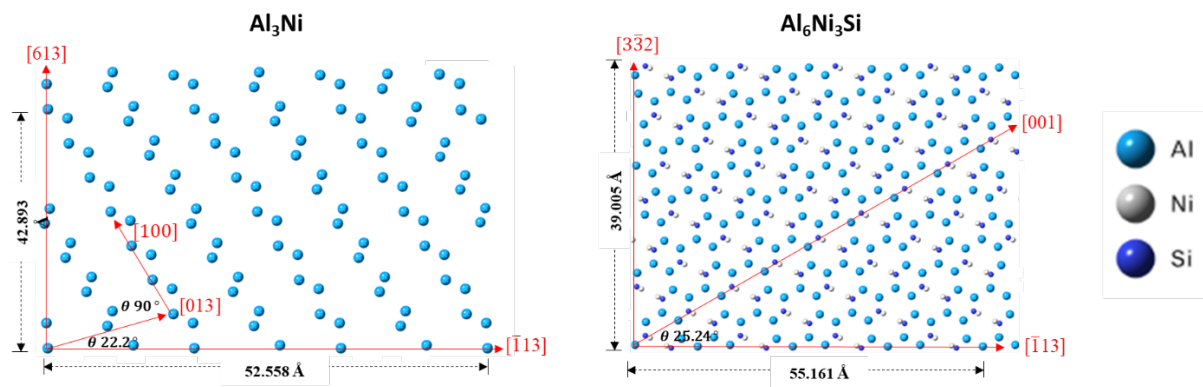


Fig S3. Atomic projections of $(0\bar{3}1)$ Al_3Ni and (110) $\text{Al}_6\text{Ni}_3\text{Si}$ planes at the habit plane on the $[\bar{1}13]$ axes.

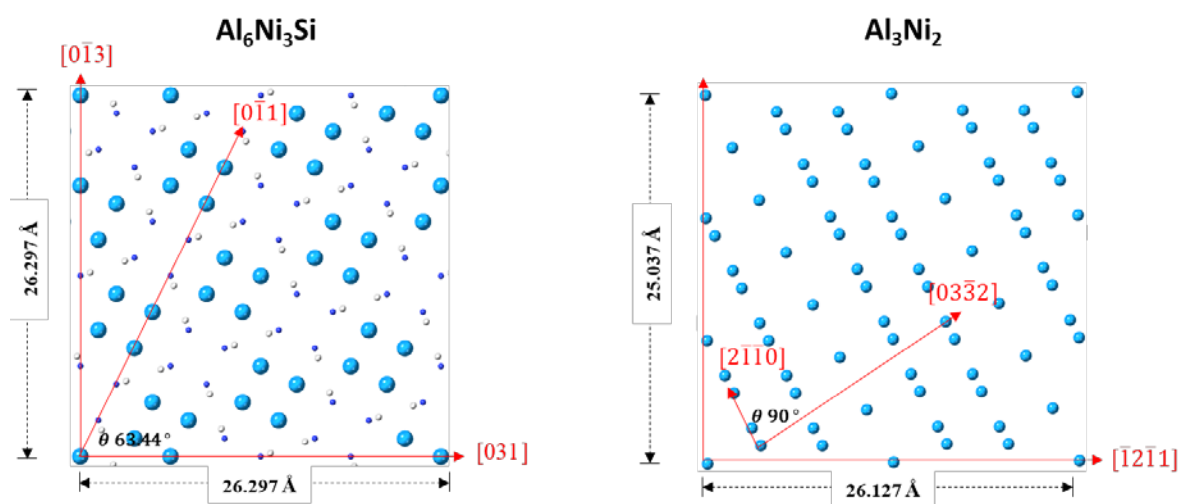


Fig S4. Atomic projections of (400) Al₆Ni₃Si and $(0\bar{1}13)$ Al₃Ni₂ planes at the habit plane on the $[031]$ axes.