

## Sympathetic nucleation of GP zones of $\theta'$ precipitates in an Al-3.6Cu-0.9Li aluminium alloy

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### Abstract

Cs-corrected high angle annular dark field scanning transmission electron microscopy (Cs-corrected HAADF-STEM) was employed to investigate the microstructure evolutions of nanometer-sizes precipitates such as  $T_1$  ( $Al_2CuLi$ ),  $\theta'$  ( $Al_2Cu$ ), and S ( $Al_2CuMg$ ); and the corresponding GP zones such as  $GP_{(T_1)}$ ,  $GP(\theta'')$ , and GPB zones, respectively, in the Al-Cu-Li (AA2050) aluminium alloy. Two nucleation mechanisms of the  $GP(\theta'')$  zones were characterized as the separated nucleation developing from  $\{100\}$  planes of Cu atoms after the solute atom clustering dissolved, and the sympathetic nucleation occurring at the joint of  $\theta'$  precipitates tangential to S precipitates. Particularly, the sympathetic nucleation of  $GP(\theta'')$  zones also occur on the edge of an individual S precipitate with the different phase structure with respect to  $GP(\theta'')$ , which was apart from previous reports.

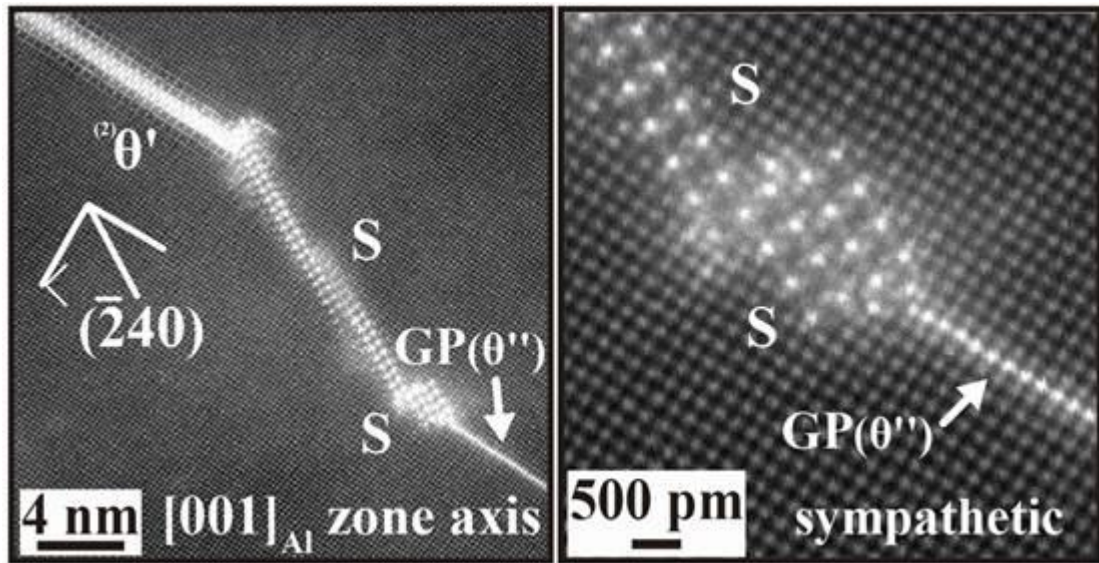


Figure. The GP( $\theta''$ ) zones sympathetically nucleated on the edge of an individual S precipitate possessing the different phase structure with respect to GP( $\theta''$ )