

Supplementary material for: Tag-and-trace method of α -Al crystals applied to study solidification and casting of aluminium alloys

Jorge Santos^{1, a}, Anders E. W. Jarfors^{1, b}, and Arne K. Dahle^{1, c}

¹ Jönköping University, School of Engineering

Department of Materials and Manufacturing

P.O Box 1026, SE-55111

Jönköping, Sweden

Corresponding author ^be-mail: anders.jarfors@ju.se

^ae-mail: jorge.santos@ju.se, ^be-mail: anders.jarfors@ju.se,

^ce-mail: arnedahle@yahoo.com.au

Figure S-1 a) shows the microstructure of the cylinder and surroundings after 10s of immersion into the commercially pure aluminium at 670°C. Figure S-2 a) shows the microstructure obtained in the equiaxed region of the sample quenched after 10s of immersion of the cylinder into the commercially pure aluminium at 700°C. The silicon and titanium distributions are also shown in Figure S-1 and Figure S-2. The treatment of the EDS maps data in MatlabTM was necessary for these samples to visualise the variations of the titanium concentration in the interior of the α -Al phase. Figure S- 3 shows a dislodged

piece containing tagged α -Al crystals and surroundings of the sample quenched after 10s of immersion of the cylinder into the commercially pure aluminium at 700°C.

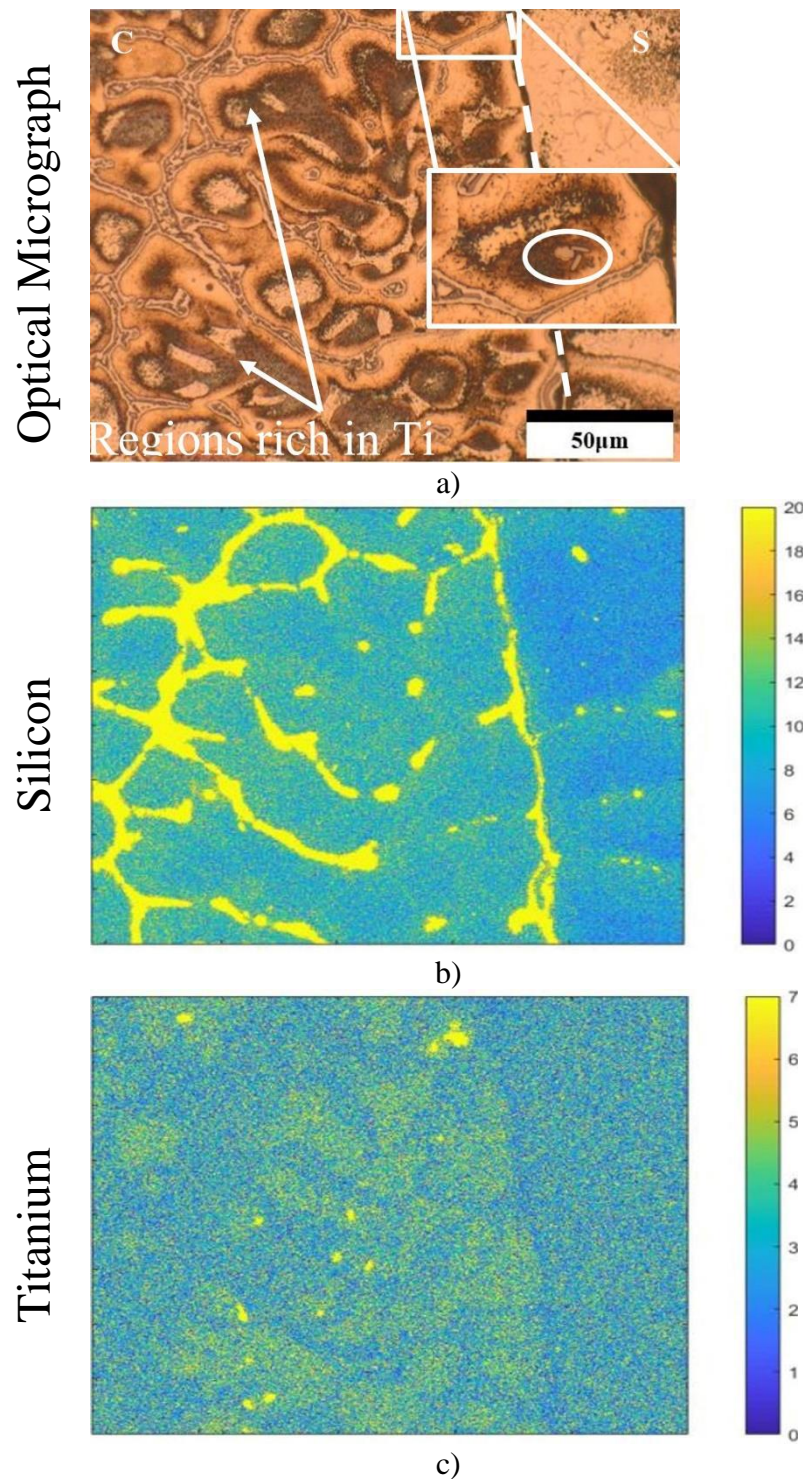


Figure S-1 – a) Optical micrograph of the cylinder and surroundings after 10s of immersion into the commercially pure aluminium at 670°C. b) Distribution of silicon and c) titanium in the region showed in a). The vertical bars in b) and c) show the number of counts obtained by EDS. The vertical bars in b) and c) show the intensity in the number of counts obtained by EDS. The dashed line separates the cylinder (C) region from the surroundings (S). The circle in a) highlight the possible location of Al_3Ti particles.

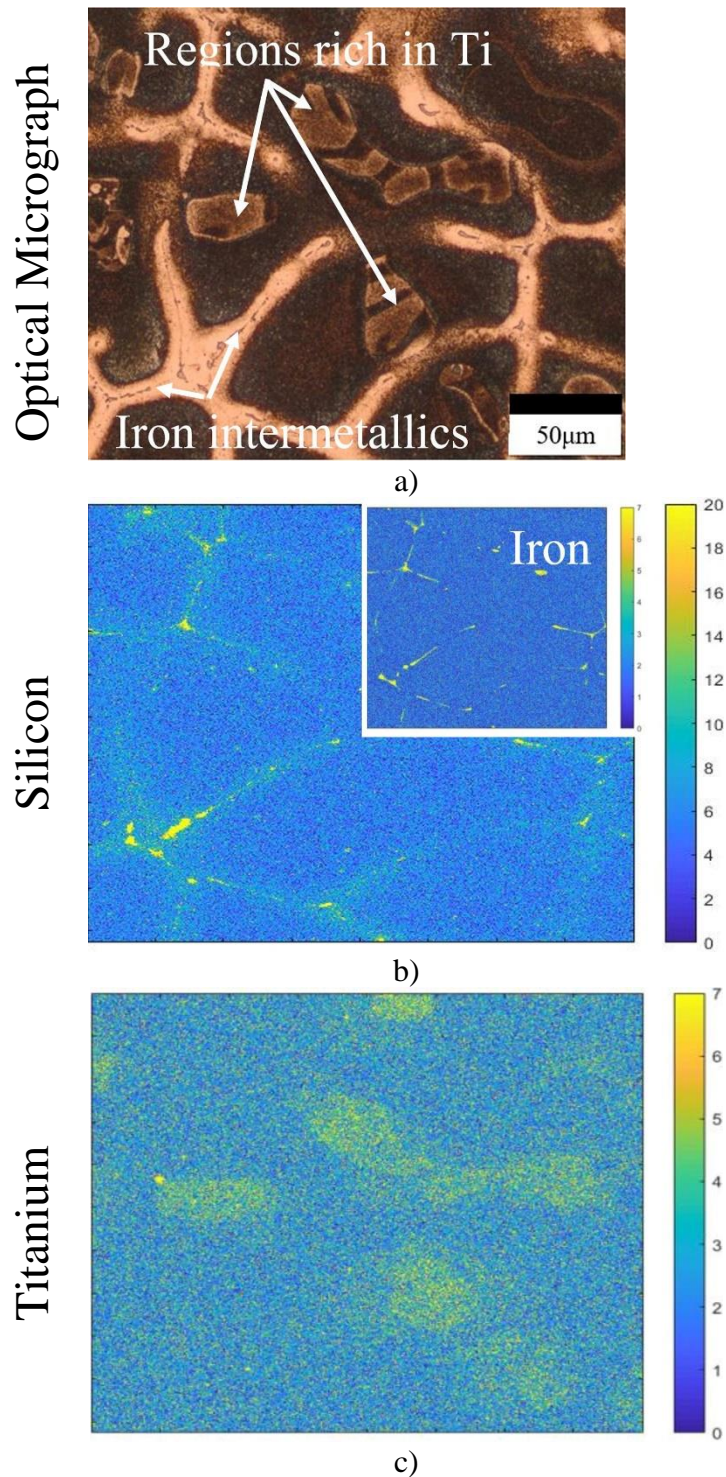


Figure S-2 – a) Optical micrograph obtained in the equiaxed region of the sample quenched after 10s of immersion into the commercially pure aluminium at 700°C. b) Distribution of silicon and c) titanium in the region showed in a). The vertical bars in b) and c) show the intensity in the number of counts obtained by EDS. The highlighted image in b) shows the iron distribution, which contains a vertical bar scale from 1 to 7.

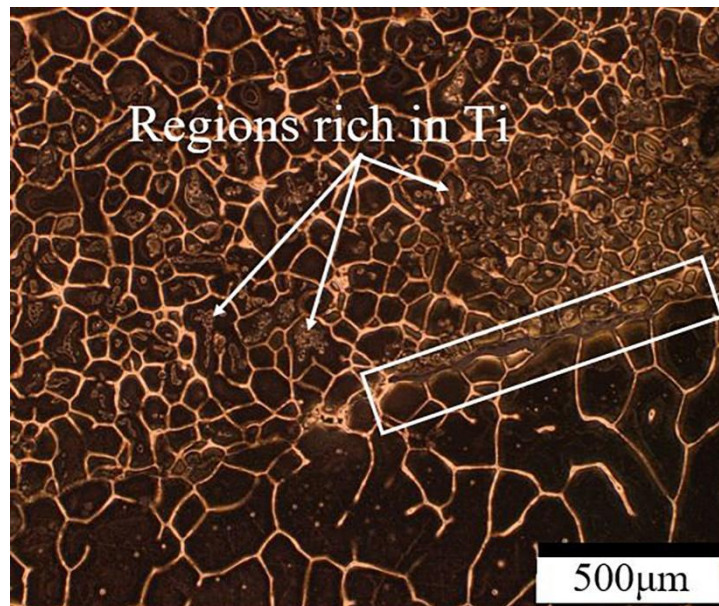


Figure S- 3 - Microstructure obtained in the equiaxed region of the sample quenched after immersion of the cylinder into commercially pure aluminium at 700°C. The rectangle highlights a region of weak bonding between the cluster of tagged α -Al crystals and the surroundings most likely due to the presence of oxides.