MM 19: Invited Talk: L. Bourgeois

Time: Wednesday 15:00–15:30 Location: H10

Invited Talk MM 19.1 Wed 15:00 H10

Structure, interfacial segregation and transformations of solid-state precipitates in aluminium alloys — •Laure Bourgeois[1,2], Nikhil Medhekar[2], and Matthew Weyland[1,2] — [1]Monash Centre for Electron Microscopy, Monash University, Victoria, Australia — [2]Department of Materials Science and Engineering, Monash University, Victoria, Australia

Solid-state precipitates are key components of many materials, and none more so perhaps than of lightweight alloys such as aluminium. These precipitates are often deeply buried inside the alloy matrix due to having at least one dimension at the nanoscale or even sub-nanoscale. These precipitates are also, in most cases, metastable phases that do not exist in a monolithic state, thus constituting difficult objects to characterise at the atomic scale. In this contribution we present the structural determination of several precipitate phases in lightweight alloys, including the classic Al-Cu, Al-Au and Al-Ag systems. Using a combination of scanning transmission electron microscopy and atomistic simulations, we reveal the existence of new interfacial structures and precipitate phases, and propose atomic-scale models for the mechanisms of nucleation and growth. This includes unexpected pathways for the formation of desired strengthening precipitates. These insights are used as a starting point to predict the precipitation behaviour of other, largely unexplored, alloy systems.