



USER MEETING 2018

22-23 NOVEMBER

National Centre for Synchrotron Science



Contribution ID: 31

Type: Oral

Production of Light Metal Alloy Powders by Reduction of Metal Oxides

Friday, 23 November 2018 13:30 (15 minutes)

Light metal alloy components fabricated via powder metallurgy processes have significantly lower manufacturing costs compared to those formed by traditional methods. Traditionally, powders are made from bulk alloy ingots, but a number of recent reduction techniques allow high purity alloy powders to be generated directly from metal oxides.

The Powder Diffraction beamline at the Australian Synchrotron was used to understand the reduction mechanism of various metal oxides used in light metal alloy formulations.

By using in-situ synchrotron techniques, it was possible to observe these highly atmosphere sensitive reactions at high temperature, highlighting phases not predicted by thermodynamics. The high angular resolution available was essential to differentiate the peaks of the intermediate phases. When a mixture of oxides was studied, the reaction path and kinetics differed from those observed for single oxide reduction experiments.

These insights will allow better understanding of the parameters that influence the process to make industrial fabrication more efficient.

Primary author: Dr CALLOCH, Pauline (Callaghan Innovation)

Co-authors: Dr INGHAM, Bridget (Callaghan Innovation); Dr ROSS, Nigel (Callaghan Innovation); Dr BROWN, Ian (Callaghan Innovation); Dr HUMPHRIES, Terry (Curtin University)

Presenter: Dr CALLOCH, Pauline (Callaghan Innovation)

Session Classification: Parallel Session 15

Track Classification: Advanced Materials