Experimental report

04/01/2021

Proposal: TEST-2891 **Council:** 4/2018

Title: Phase characterization for material devleopment related to Al production

Research area:

This proposal is a new proposal

Main proposer: Ariane MARMOTTANT

Experimental team:

Local contacts: Thomas HANSEN

Samples: iron oxide Fe3O4
sodium cryolithe Na3AlF6

Instrument	Requested days	Allocated days	From	To
D20	1	1	18/06/2018	19/06/2018

Abstract:

Report on the feasibility study carried out for RIO TINTO:

Phase characterisation for material development related to the production of Aluminium

Study ID: 2017-23, Institut Laue-Langevin (ILL)

Version Table

Author	Date	Comments
C. Boudou and T. Hansen	12/07/2018	Creation of document based on Rio Tinto's request and technical report from Thomas Hansen
C. Boudou	01/08/2018	Report from T. Hansen included.
A. Marmottant	12/06/2019	Review
C. Boudou	13/06/2019	Comments integrated
A. Marmottant	09/09/2019	Final recommendation before publication and approval
C. Boudou	09/09/2019	Final version.

Foreword

This document is a report about a feasibility test carried out in the framework of the SINE2020 project. Technical information related to measurements is provided by the scientist in charge of the experiment.

Everything written in this document is supposed to serve as basis for communication purposes. Any other document will be however reviewed before publication by the relevant persons (from the companies, institutes, academics).

Content

1. Executive Summary

Feasibility study number / date **Title**	2017-23, 12/03/2018 and 18/06/2018 **Phase characterisation for material development related to the production of Aluminium**
Neutron centre (country)	Institut Laue-Langevin (France)
Scientist in charge of the experiment	Thomas HANSEN +33 476 207 044, hansen@ill.eu
Technique	Powder diffraction
Name of the company / industrial sector Contact (phone, email)	Rio Tinto / mining-metallurgy Ariane MARMOTTANT, R&D Engineer - Refractory Materials for Aluminium Electrolysis +33 (0)476578956, , ariane.marmottant@riotinto.com
Beamtime allocated (hours, days) and consultancy when applicable **=> value of the test (total in Euros)**	**24 hours beam time** + 16 h consultancy => **24 000 €** (without taxes)
Context *Problem description, expectations, question asked by the company*	In the frame of the development of a new material for the Aluminium production at RIO TINTO, fundamental data on phase transformations at high temperature are needed in order to optimize industrial process parameters. The goal of the experiment was to determine which phases are present at operating temperature
Outcome of the experiment (for the company) *Question answered? Other findings? Relevant facts?*	The question has been very partially addressed. One phase appeared and disappeared.
Further action? Yes/no. If yes, of which type. If no, why? **Indicator fo fur purchase indicator** 1= very likely, 2=possible, 3=very unlikely	No Indicator = 3
Comments from the company	Experimental conditions should be fine-tuned to determine the composition of the intermediate phases. However today the company strategy does not allow for long term research investigations.
Comments from the institute's scientist *Any remarks about the process regarding SINE2020, the experiment, the outcome, etc*	Not answered
Comments from SINE2020 Industry Liaison Officer	The coordination went smoothly thanks to the geographic proximity. It would be desirable for the ILL scientist to be more available to process the data in the days following the measurements.