

## **Development of a DSC technique for analysis of aluminium in collaboration with Sapa**

### **Background**

DSC is reported in the literature to be used for measuring phase transformation and partial or total melting of different metals, among others aluminium alloys. This gives very valuable and quick information. Even the presence of low melting elements in aluminium is analysed using this technique. The levels analysed are usually of some percent. However, we would need this type of analysis to determine the behaviour of low melting trace elements in fin heat exchanger materials, where the concentration of these elements is far below 1%. It is not known today if the method will be sufficiently accurate to perform these analysis, which shall be determined in this work.

In order to be able to perform such analysis, we need to learn how DSC equipment shall be used for metals and to optimize this use.

We know that the sensitivity of the DSC equipment at Swerea KIMAB is sufficient to analyse melting and phase transformations, which will be the first step of the work. This will allow to gather valuable information for Sapa and to optimise the measuring technique.

### **Project objectives:**

The main objectives are:

- To optimise the use of our DSC equipment for analysis of melting and phase transformation of aluminium and to perform measurements on alloys from Sapa
- To determine the sensitivity of the equipment for analysis of trace elements in aluminium and to perform measurements on alloys from Sapa

### **Project organisation:**

This project is a master thesis work at Swerea KIMAB in close collaboration with Sapa. At least one visit to Sapa is included in the work. Following steps will be done:

- Literature survey, DSC use for studying aluminium and brass
- Optimisation of Swerea KIMABs DSC for aluminium analysis
- Measurements of melting and phase transformation on alloys from Sapa
- Use of the DSC on fin materials from Sapa, sensitivity limit of the method.

**Project start date:** spring-summer 2011

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