**Age Hardening Laboratory.**

After solution treatment, age hardening will be conducted on samples of Al 2024 T3. 1in by 1in by 1/16\textsuperscript{th} of an inch samples will be placed in small furnaces at temperatures of 125, 185 and 287C. One sample will be left in air. Hardness testing on the Rockwell 30T scale will be used to measure the hardness of the material as a function of time for each ageing temperatures. The outcome will be a graph of hardness against log time to indicate the stages of age hardening.

**Theory**

See class 9.

**Reports**

An individual written lab report will be due on this lab one week after the lab – see the section on “Report Writing”

A group oral report will be given by each group two weeks after the lab. A Powerpoint presentation will be required from each group so record it on a CD or memory stick.

**Materials**

Four 1in by 1in by 1/16\textsuperscript{th} of an inch samples of Al 2024 T3 in the solution treated condition. The solution treatment was 550C for 45 minutes.

An Inston hardness tester with a 1/16 of an inch ball indenter on the Rockwell 30T scale, with a preload of 3kg and a major load of 30kg.

Three furnaces set to 125,185 and 275C for ageing.

Tongs for removal of samples.

Beakers filled with water to cool the samples after removal from the furnace.

Ice to keep the samples cool after solution treatment and before ageing.

**Experiment.**

Each group take one sample from the ice container. Hardness test to obtain initial hardness value, record data. Place in furnace for 5 minutes, remove, allow to cool, then hardness test and record data. Repeat this for furnace time intervals of 5mins, 5mins, 15mins, 15mins and 15mins for total ageing time of 5,10,15,30,45 and 60 minutes, recording the hardness data after every furnace treatment. Obtain other groups data for the different ageing temperatures. Plot hardness v log time to determine the hardness behavior.
Section of Al Cu phase diagram.