**Experimental study of the Cu-Al-Sn phase equilibria, close to the copper zone**

List of tables:

Table 1 – Alloys chemical composition (in wt%), obtained by XRF Spectrometry, and transformations temperatures.

|  |  |  |
| --- | --- | --- |
| Sample | Composition (wt. %) | Transformation temperature (°C) |
| Cu | Al | Sn | *Liquidus* | *Solidus* |
| *Eutectic*[1] | 92.0 | 8.0 | 0.0 | ≈1032 |
| 10 | 88.0 | 8.0 | 4.0 | 1013.8 | 955.7 |
| 11 | 87.0 | 8.0 | 5.0 | 1010.3 | 935.4 |
| 9 | 86.0 | 8.0 | 6.0 | 1004.0 | 919.0 |

Table 2 – Alloys chemical composition (in wt%), obtained by XRF Spectrometry, and the *liquidus* temperature determined for each sample by DTA thermal analysis.

|  |  |  |
| --- | --- | --- |
| Sample | Composition (wt %) | *Liquidus* temperature (°C) |
| Cu | Al | Sn |
| 1 | 84.1 | 1.0 | 14.9 | 953.1 |
| 2 | 84.2 | 2.0 | 13.8 | 962.0 |
| 3 | 85.1 | 3.0 | 11.9 | 972.8 |
| 4 | 86.1 | 4.0 | 9.9 | 985.2 |
| 5 | 87.0 | 5.0 | 8.0 | 993.6 |
| 6 | 89.0 | 6.0 | 5.0 | 1011.3 |
| 7 | 88.0 | 6.0 | 6.0 | 1001.3 |
| 8 | 89.1 | 7.0 | 3.9 | 1010.4 |
| 9 | 88.0 | 8.0 | 4.0 | 1013.8 |
| 10 | 87.0 | 8.0 | 5.0 | 1010.3 |
| 11 | 86.0 | 8.0 | 6.0 | 1004.0 |
| 12 | 89.1 | 8.9 | 2.0 | 1032.7 |
| 13 | 88.0 | 9.0 | 3.0 | 1021.0 |
| 14 | 89.0 | 10.0 | 1.0 | 1030.0 |

Table 3 – Alloy phase compositions with the increasing of Al and decreasing of Sn.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | Element | α phase (wt. %) | β phase (wt. %) | Sample | Element | α phase (wt. %) | β phase (wt. %) |
| 1 | Al | 4.28 | 2.79 | 8 | Al | 7.49 | 8.16 |
| Sn | 6.46 | 17.52 | Sn | 2.33 | 5.73 |
| 2 | Al | 1.95 | 0.93 | 9 | Al | 6.60 | 6.58 |
| Sn | 10.02 | 21.36 | Sn | 3.38 | 8.68 |
| 3 | Al | 3.30 | 1.93 | 10 | Al | 6.59 | 6.52 |
| Sn | 7.96 | 19.56 | Sn | 3.15 | 8.72 |
| 4 | Al | 0.64 | 0.12 | 11 | Al | 6.58 | 6.58 |
| Sn | 10.15 | 22.05 | Sn | 3.09 | 8.60 |
| 5 | Al | 5.19 | 3.83 | 12 | Al | 7.70 | 9.08 |
| Sn | 5.33 | 15.86 | Sn | 1.46 | 3.16 |
| 6 | Al | 6.26 | 5.57 | 13 | Al | 8.29 | 9.53 |
| Sn | 3.26 | 11.73 | Sn | 1.77 | 3.72 |
| 7 | Al | 5.92 | 3.87 | 14 | Al | 8.98 | 10.81 |
| Sn | 4.27 | 15.49 | Sn | 0.49 | 1.10 |