**Al-B-C ternary compounds : synthesis, structure, composition and thermal stability**

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The Al-B-C ternary system present some interest in the synthesis of Metal Matrix Composites because of the high hardness of B4C phase and the low densities of both the Al-matrix and the carbide reinforcement [1]. Review of phase equilibria clearly indicates that boron carbide and Al are not in thermodynamic equilibrium until an unknown but very high temperature (above 1400°C) [2]. However, some ternary carbides such as 3-Al3B48C2 are reported to have properties similar to boron carbide while being also characterized by a low density. As a consequence, extensive determination of phase equilibiria in the Al-B-C ternary system, especially at high temperature, is of interest not only to bring new insights in a unknown domain but also to sustain the development of synthesis processes of Al-base composite reinforced by B-rich particles.

In the present study, several Al-B-C ternary phases such as 1-Al2.1B51C8, 2-AlB40C43-Al3B48C2, -Al3BC3 and 5-Al3BC have been synthesized. Phase structure was characterized by X-Ray diffraction (both on powder and single crystals) and Raman spectroscopy while their composition was determined by EDX analysis performed on single crystals. Moreover, the thermal stability and more precisely the decomposition temperature and reaction of the ternary compounds were also determined by SDTA at high temperature.

This experimental study allows us to propose new isothermal sections at high temperature as well as an upgrade version of the reaction scheme initially proposed by Grytsiv and Rogl [1]. In the future, the present results will be used to perform a thermodynamic assessment of the Al-B-C ternary system.

1. [1] H. Yang et al., Materials Science and Engineering A, 616 (2014) 35-43.
2. [2] A. Grytsiv and P. Rogl, in *Ternary Alloy Systems - Phase Diagrams, Crystallographic and Thermodynamic Data: Light Metal Systems, Part 1: Selected Systems from Ag-Al-Cu to Al-Cu-Er*, Ed. Effenberg, G.; Ilyenko, S., 2004, 29-51