Solvothermal Processes for Nitride Synthesis: Examples of Li₃GaN₂ and Graphitic C₃N₄ Elaboration

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Dedicated to Professor Gérard Demazeau on the occasion of his 65th birthday

When precursors decompose or react in the presence of a solvent in a closed system at a temperature higher than the solvent’s boiling point the reaction is called a solvothermal process. This reaction can be carried out either in supercritical or subcritical conditions, in homogeneous or heterogeneous systems, pressure and temperature being both key parameters. As the main interest of such processes is the enhancement of chemical reactivity, solvothermal reactions have been widely involved for nitride elaboration. We report two examples relative to solvothermal syntheses of nitrides. The first one deals with the elaboration of Li₃GaN₂: this ionic nitride has been successfully synthesized, structurally characterized and tested as nutrient for the ammonothermal GaN crystal growth. The second one is related to the elaboration of a well-crystallized graphitic carbon nitride (g-C₃N₄) aimed to be developed as a precursor for conversion towards dense CNₓ phases.

Key words: Solvothermal Synthesis, Nitrides, Carbon Nitride, GaN, Li₃GaN₂