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# Oxynitride phosphate glasses: new strategies of synthesis for new applications

Francisco Muñoz\*<sup>1</sup>

<sup>1</sup>Institute of Ceramics and Glass (CSIC) (ICV-CSIC) – kelsen 5, 28049 Madrid (Spain), Spain

## Abstract

Oxynitride phosphate glasses, or nitrated phosphates, were firstly obtained by Roger Marchand at the University of Rennes 1 in the early 80's through reaction of NH<sub>3</sub> with a NaPO<sub>3</sub> glass [1]. Further studies soon arrived and were mainly done in France, USA and Spain, but the method of synthesis did not practically change. Meanwhile a great number of compositions were designed and important structural studies developed with the help of NMR and XPS spectroscopies, their applicability has been very limited and often regarded as unfeasible due to the inherent difficulties when handling ammonia. The potential use of oxynitride phosphates as low temperature sealing glasses has undoubtedly been the main option for their application, but there has been other fields where the incorporation of nitrogen produces very interesting modifications, not only increasing the thermal and chemical stability but also giving rise to an important improvement of the ionic conductivity, such as in the case of the so-called LiPON materials [2,3]. On the other hand, if the phosphate glass susceptible of nitridation must contain other elements, e.g. F, S or transition metal ions, the reaction with NH<sub>3</sub> needs to be reconsidered as other reactions may take place during the synthesis, and the processing of the oxynitride glass becomes more complicated and not only depending on the viscosity of the melt. This talk will review the processing and structure of the oxynitride phosphate glasses and the works in which additional steps of synthesis were needed to obtain glasses with new chemical, electrical or even optical functionalities [4].

References:

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\*Speaker