DISSOLUTION BEHAVIOUR OF A NEW SOL-GEL DERIVED PHOSPHATE GLASS

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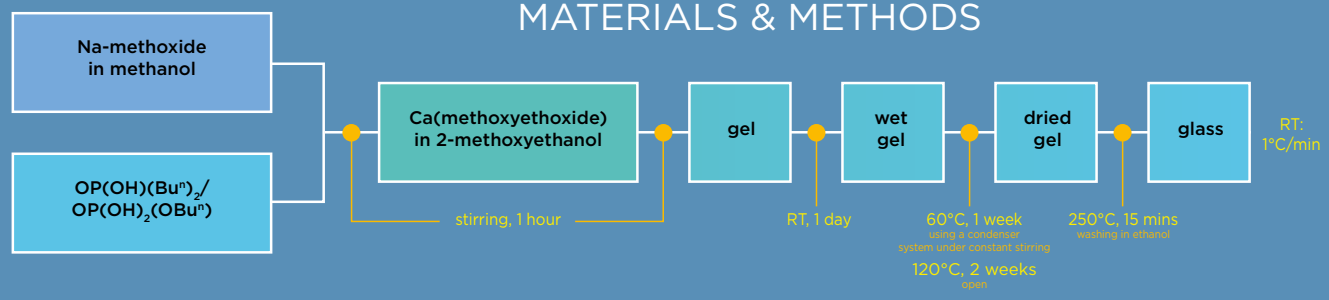
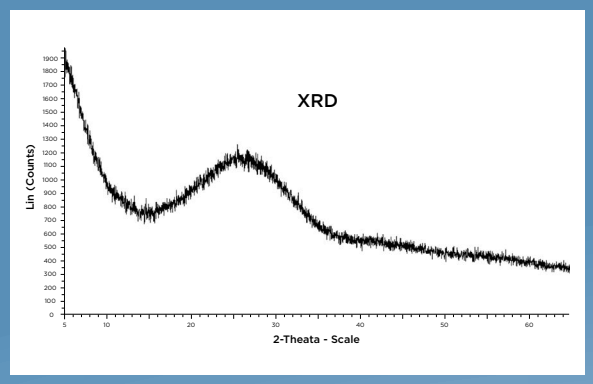
INTRODUCTION

The present poster describes the relative leaching kinetics of a new sol-gel phosphate-based glass (PBG). A possible explanation of the mechanism is also given based on the available knowledge of the structure of the phosphate glass network..

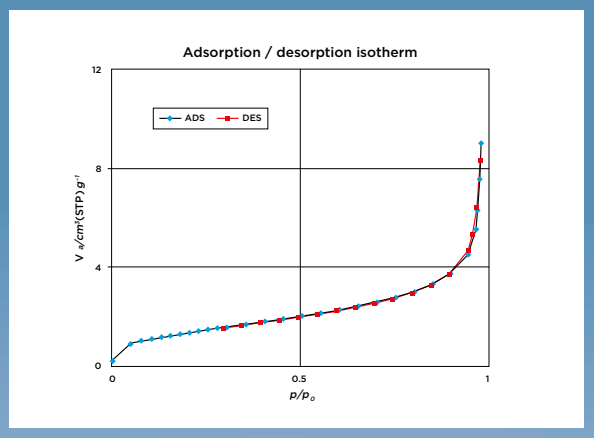
MATERIALS & METHODS



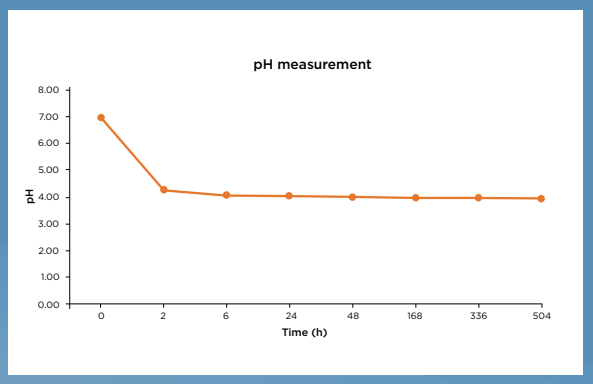
(P2O548%-CaO28%-Na2O24%, mol %)



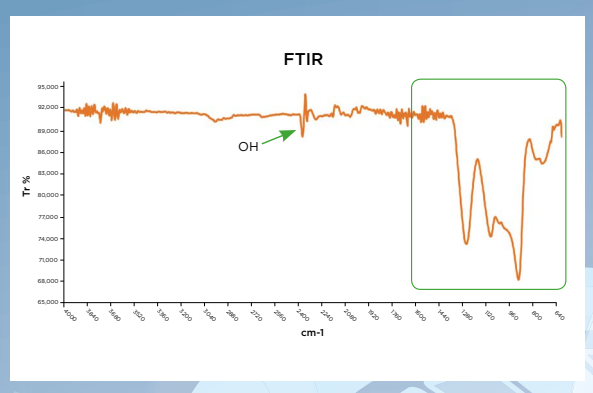
The XRD pattern shows a broad peak indicating that the material has a glassy amorphous phase



Type II hysteresis typical of nonporous adsorbents

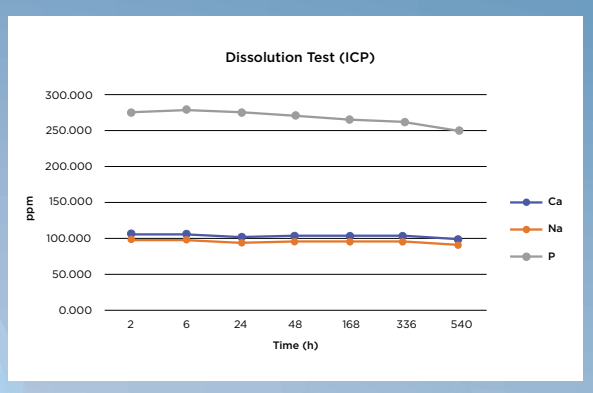


After 2 hours of incubation in water, the pH dropped due to the presence of phosphate ions in the media arising from dissolution/distruption of the POP bound



The typical atomic bonds present in a phosphate glass network are visible in the fingerprint region (green box)

RESULTS



The PBG was found to degrade in water quickly exhibiting a burst release

CONCLUSIONS

Sol-gel PBGs contain a significant amount of OH groups which act as chain terminators and strongly reduce network connectivity. Furthermore, they diminish chain length: the bridging action of modifiers is thus potentially weaker resulting in less connectivity. This is enhanced by a glass structure dominated by POP chains due to the phosphate content. The combination of those factors determine a faster protonation of the most external NBOs that causes the instant hydrolysis of the network and the burst release of the ions.

ACKNOWLEDGMENT

The research leading to this poster has received funding from the European Union Seventh Framework Program (FP7/2007-2013) under grant agreement n°608197