[Reprinted from the Journal of The American Ceramic Society, Vol. 45, No. 5, May, 1962.

Some Studies of Effect of High Pressure on a Lithia-Alumina-Silica Glass

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The effect of near-hydrostatic pressure on the synthesis of a lithia-alumina-silca glass was studied. It was found that the fusion of the oxides to form a glass melt was seriously impeded. A study also was made of the effect of hydrostatic pressure on the crystallization of a previously synthesized glass of similar composition. The approach to equilibrium in the system was found to be more rapid than at atmospheric pressure. In addition, a minor amount of a phase which could not be synthesized directly from the melt (α-spodumene) was found.

I. Introduction

THE effect of near-hydrostatic pressure* on the synthesis and devitrification of a glass-forming system has been studied.

In choosing a system, it was desired that it should (1) melt readily at relatively low temperatures (below 1000°C) because it was expected that pressure would increase the melting

Received May 15, 1961; revised copy received October 19, 1961.

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* Purely hydrostatic conditions are attainable only in equipment using fluid pressure-transmitting media. 30,000 bars is an upper limit for such devices. In the system used in this study solid pressure-transmitting materials were employed which possessed relatively low shear moduli under pressure. Although shear components do exist, they have been found to be small by observation of deformation.