# Corrosion of AZS refractory materials during production of Ba crystalline glass and design of methodology for their evaluation

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## ABSTRACT

The corrosion resistance in AZS refractory materials during the production of Ba crystalline glass is a crucial aspect to ensure the performance of the AZS refractory materials. Various methods have been investigated to improve the refractory materials corrosion resistance, including using additives, coatings, modification of material composition, and processing condition optimization. In this study, the corrosion resistance of the AZS refractory materials will be evaluated using various techniques and lab-scale tests such as (static and dynamic tests, hot stage microscopy, crucible test, finger test, rotating finger test, etc.) to obtain the most relevant data on the formation of inhomogeneities and corrosion resistance behavior of the tested materials. One of the aims of the work is the evaluation methodology for new AZS material, which will be provided by novel radar/ ultrasound non-destructive testing (NDT) techniques. The results obtained from these evaluations will provide valuable insights into the performance, durability, porosity, and overall quality of the selected refractory material. This research will provide an overview of the mechanisms of corrosion, issues of refractory corrosion in the industrial sector, refractory degradation, properties and durability in refractory materials, and the strategies that have been employed to enhance their resistance to corrosion. The research brings attention to the ongoing challenges in the field, such as improving the precision of corrosion behavior models and selecting the most suitable refractory materials for specific locations, such as the critical area of the melting aggregate called the throat. The final step of the project involves gathering and analyzing data from the actual melting process. This includes information on temperature, pull rate, and the condition of the melting material's throat. Samples of refractory materials are collected after the service campaign ends and used for analysis. By examining the data, we can determine the best conditions to minimize defects and improve the melting process. This will ultimately increase the lifetime of the melting aggregate and production yield.

**Keywords**: AZS refractory materials, corrosion process, NDT test, Ba crystalline glass

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