

ROUTINE ANALYSIS OF BORON IN GLASS USING WAVELENGTH DISPERSIVE X-RAY FLUORESCENCE SPECTROSCOPY

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Wavelength Dispersive X-Ray Fluorescent Spectroscopy (WDXRF) has been used at Corning Incorporated for routine composition monitoring since the early 1960's. The instrumentation and sample preparation options have improved over the years providing more and more opportunities for process monitoring with WDXRF. The recent improvements in the WDXRF instrumentation; X-ray tube design, tube coupling, improved multi-layer analyzing crystal, and flow detector design have made it possible to analyze boron by WDXRF.

The Boron concentration in glass influences the glass properties and monitoring the boron concentration is important for glass production control. Traditionally boron analysis is done by ICP-AES or classical chemistry titration of mannitoboric acid after fusing the sample with sodium carbonate. Both methods are time consuming and the ICP-AES method uses hazardous HF acid. The use WDXRF for boron analysis in glass provides the opportunity to track the boron concentration in less time, with less hazardous materials and with the same precision as the historical methods.

Sample preparation is also a critical component of the boron analysis by WDXRF. Surface roughness and surface glass process history can influence the XRF boron results. The bulk boron analysis in glass needs to be measured on a ground and polished surface to remove the surface process history and insure a flat, smooth analysis surface.

This poster will compare the sample preparation of sheet glass, which is very difficult to grind and polish consistently due to the glass flexibility while processing, as well as the comparison of boron by XRF, ICP-AES and Classical chemistry methods.