ŞİŞECAM INTERNATIONAL GLASS CONFERENCE

combined with

34th Şişecam Glass Symposium

Glass in the Sustainable Future:

ACHIEVING WHAT IS POSSIBLE...

November 21-22, 2019



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Session	Surfaces-Interfaces and Advanced Glass Processing
Date	NOVEMBER 21, 2019, THURSDAY
Time	16:40 - 17:00
Hall	SAMATYA
Chair	VINCENZO M. SGLAVO

THE EFFECT OF DIFFERENT CALCIUM COMPOUNDS ON BATH CONTAMINATION IN CHEMICAL STRENGTHENING PROCESS

Aslı Çalı[1], Büşra Demir[1,2], Nahide Özben[1], Semin Atılgan[1], Ali Erçin Ersundu[2], Miray Çelikbilek Ersundu[2], İlkay Sökmen[1]
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Although there are many methods to improve the strength of glass, the most preferred method in industrial applications for thin glasses is chemical tempering. Chemical tempering method offers several advantageous properties such as, applicability to thin and complex shaped glasses and providing higher compressive stress values compared to other alternatives. However, there are important parameters to be considered during the chemical tempering process. One of the key parameters that should be considered is bath contamination. Therefore, in this study we aim to investigate the effect of bath contamination through different forms of calcium compounds on chemical strengthening efficiency. In the experimental studies, 1.1 mm soda-lime silicate glasses were washed with distilled water and alcohol, respectively and then subjected to chemical tempering at 450°C for 4 h. The experimental studies were carried out using different salt baths having various amounts of contaminants i.e. Ca(NO3)2, CaHCO3, CaCO2, CaO. The compressive stress and depth of layer values were measured using FSM 6000LE surface stress meter to understand the chemical tempering efficiency. Fourier Transform Infrared Spectroscopy (FTIR) analysis was realized to evaluate the changes in bond structure and to investigate the corrosion behavior. Haze and transmittance tests were performed under visible light to examine the optical properties. Methylene blue and tartaric acid tests were used to determine stain formation and coloration, respectively. In addition, aging tests were applied to all samples for 14 days at 50°C and under 95% relative humidity to investigate the resistance of glasses to atmospheric humidity conditions. Following to aging testes, all characterizations were repeated, and the obtained results were compared with the results of pre-aged samples. In addition, pH and alkalinity tests were applied to the salt baths. The primary results show that the Ca addition, even in small amounts, has negative effect on the chemical tempering efficiency.

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Keywords: *chemical strengthening, salt bath, contamination, calcium compounds*