Sustainability in Glass Manufacturing: Contribution from Silica and Silicates

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Abstract

The European Union is dedicating billions of euro's to the aim of becoming climate neutral by 2050. More than a 100 M€ is allocated to projects in the glass industry and targets carbon neutrality though hydrogen combustion, electric and hybrid furnaces, biofuel and syngas combustion, or carbon capture technologies.1 All these 'net-zero technology' projects focus on alternatives to carbon-based fuels, but not on intrinsic improvements to the melting process itself.

In this paper the relation between the batch melting process and the energy requirement of industrial glass furnaces will be discussed based on the energy breakdown of a float furnace. It emphasises the gains that could be achieved by improving the batch melting process and reduce the average residence time of glass at high temperatures.

To obtain the intended glass quality, an energy-intensive homogenization step is required because the primary glass phases that are formed are of inferior quality. The choice of raw material has a direct influence on the quality of the primary melting phases and the time required for homogenization of the glass, and thus on the energy consumption of the glass furnace. By using alternative silica materials and silicates, the quality of the primary melt phase can be greatly improved and less energy will be required for the homogenization process.

• Carneiro (2023) Carbon Neutrality: Funding Projects and Future Challenges. GlassTrend-NGF Seminar.

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