The influence of hydrogen co-firing on the physical and chemical properties of different glasses

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Abstract

Results originating from the Project H2-Glas (AiF-IGF research project 21745 N) The glass industry is a very energy intensive industry. It emits in Europe around 22 Mio t per year of CO2 (1). The main source for these emissions are the glass melting furnaces, which are nowadays mainly fired with natural gas. Although electrification is believed to take place in many places, there are still several applications that depend on a melting tank that is fired with molecules. Examples are float glass furnaces, due to the size of the tank and the production of amber glass due to its special reduction properties.

Producing glass is a continuous process that needs a constant supply of energy. In places were the electric grid is not able to support the loads a glass furnace needs electrification is not an option.

In these cases hydrogen is supposed to be the fuel source of choice.

In the two projects, mentioned above, different mixtures of hydrogen and natural gas with either air (HY-Glass) or oxygen (H2-Glas) were evaluated as fuel.

Industrial glass batch for sorts of glass, e.g. container glass of different colors, float glass and tableware were used to produce the samples in alumina crucibles. The samples were analyzed using a variety of physical methods to reveal the underlying mechanisms.

The amber glass samples were the ones that showed the most differences when melted under a hydrogen containing atmosphere. These changes in color and chemistry are attributed to the changing water content of the atmosphere in the furnace.

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(1) https://cinea.ec.europa.eu/news-events/news/how-life-reducing-emissions-glass-production-2022-03-16_en

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