Environmental protection through utilization of recycled glass as fluxing agent in the structural ceramics industry

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For the manufacturing of ceramics products the structural ceramics industry uses very high firing temperatures, especially in the manufacturing of stoneware or clinker. In these cases it is important to reach temperatures as high as 1300 ºC to get the technical characteristics that are required from these products, which are basically low absorption and high mechanical resistance. The main goal of the present work is the reduction of the environmental impact in the structural ceramic sector through the introduction in the ceramic pastry of recycled glass as a flux. The use of glass causes a reduction of firing temperature, since the glass starts to melt at lower temperature than the ones used for the vitrification of the ceramic pastry. In earthenware the clay melts at 1250 ºC; when glass is added the melting temperature decreases to 1110 ºC which means an energy saving of 10-15% and a reduction of about 2000 tons of CO_2 emissions per year for a medium-size factory (brick production capacity of 300 tons per day). The use of recycled glass as a raw material entails the transformation of a waste into a resource, diversifying and extending the possibilities of the use of glass at the end of its life-span. In this sense, the use of glass as a flux lowers the quality requirements of raw material and since glass of any type, composition and color may be used (e.g. glass from waste electrical and electronic equipment, glass from end of life vehicles, glass mixed with municipal solid waste). The replacement of clay glass contributes to the preservation of a natural resources, reducing the ecological footprint (environmental impact caused by human demand for natural resources), and promoting recycling of recoverable waste.