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Soda lime silica glasses obtained from industrial solid wastes

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In this work, soda-lime glasses were produced using industrial solid wastes such as rice husk ash (RHA) and spent catalyst at the Petrochemical Fluid Catalytic Cracking units (ECAT) as alternative raw materials for silica (SiO₂) and alumina (Al₂O₃). These correspond to two particularly valuable solid wastes, which are not well explored in the viewpoint of glass production. For the fabrication of vitreous samples we have also used, besides the wastes, commercial sodium carbonate and lime. Soda-lime glass containing the wastes was prepared by melting in alumina crucibles at 1600°C for 1 hour. Annealing treatments were performed for 3 hours at 530°C and then cooled to room temperature inside the furnace. The glass samples were characterized using XRF, XRD, ATG and visible spectrometer. The color measurement by (CIE) chromaticity diagram and optical transmission showed a good optical transparency of the glass samples, which confirmed the total vitrification. The results demonstrate that both can be used in their raw form (without treatment) replacing important raw materials, sources of Al₂O₃ and SiO₂, essential for glass formation. The samples obtained presented amber color due to the presence of nickel (Ni²⁺ ion) from ECAT. Thus, the obtained glass is suitable for applications requiring low light transmittance such as colored glasses containers in general, which does not require complete visibility and transparency.