Title : Preparation of Colored Glass from Recycled Materials for Jewelry Application.

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ABSTRACT

This research aimed to prepare orange–pink colored glass using borosilicate glass cullet and longan wood ash as the major raw materials for jewelry applications. Erbium oxide (Er_2O_3) was doped as a coloring agent in the range of 0.5 to 1.5 wt%. The glass batches consisted of more than 80 wt% combined borosilicate cullet and longan wood ash, cooperating with fluxing agents, and were melted in an electric furnace at 1350 °C . The molten glass was then cast into a metal mold and annealed at 550 °C for 1.5 hours, followed by furnace cooling. The structure of the synthesized glasses was characterized. Optical absorption, density, refractive index, Mohs hardness scale, and impurity distribution were also investigated. The results revealed that all synthesized glasses were completely melted and exhibited an amorphous structure, as indicated by the presence of a single broad peak. The glasses showed an orange–pink coloration attributed to Er^{3+} ions, with characteristic absorption bands observed in the ranges of 400–490 and 525–530 nm. The color intensity increased with increasing Er_2O_3content. The density slightly increased from 2.76 to 2.79 g/cm³. On the other hand, the refractive index increased from 1.57 to 1.59 with higher Er_2O_3 content. The Mohs hardness scale was approximately 5. Impurity analysis confirmed a homogeneous distribution of the coloring agent without crystallization or phase separation. After cutting and polishing, all synthesized glasses could be successfully processed into glass beads exhibiting good transparency, high gloss, and a distinct orange–pink color. The obtained glasses were suitable for incorporation with metal components for jewelry applications.

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