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Optimized Synthesis of Foam Glass from Recycled CRT Panel Glass

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Most of the panel glass from cathode ray tubes (CRTs) is landfilled today. Instead of landfilling, the panel glass can be turned into new environment-friendly foam glass. Low density foam glass is an effective heat insulating material and can be produced just by using recycle glass and foaming additives. In this work we recycle the CRT panel glass to synthesize the foam glass as a crucial component of building and insulating materials. The synthesis conditions such as foaming temperature, duration, glass particle size, type and concentrations of foaming agents, and so on are optimized by performing systematic experiments. In particular, the concentration of foaming agents is an important parameter that influences the size of bubbles and the distribution of bubbles throughout the sample. The foam glasses are characterised regarding density and open/closed porosity. Differential scanning calorimetric data show that panel glass possesses good stability against crystallisation. X-ray diffraction data show that the foaming agents enhance the surface crystallisation of the panel glass. We find that the crystallisation impedes the formation of low density foam glass.