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- An Invited Talk

König, Jakob; Petersen, Rasmus Rosenlund; Yue, Yuanzheng

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Improving the thermal insulation properties of the foam glasses

Jakob König^{1,2,*}, Rasmus R. Petersen¹, Yuanzheng Yue¹

¹ Section of Chemistry, Aalborg University, DK-9000 Aalborg, Denmark

² Advanced Materials Department, Jožef Stefan Institute, SI-1000 Ljubljana, Slovenia

* Corresponding author. E-mail: jakob.konig@ijs.si

Foam glass is a lightweight material used for thermal and acoustic insulation applications in the construction and other industries. It exhibits several advantages in comparison to insulation materials such as organic foams and mineral wool, e.g., water and steam resistance, freeze-thaw cycle tolerance, excellent chemical and thermal stability, and superior mechanical properties. In the last decade, the possibility of recycling different glass cullets and waste glassy materials into this high value added product has been presented. The main drawbacks of foam glass are its high unit price and somewhat higher thermal conductivity. These issues, however, are not addressed in the scientific community. Here, we present the background of the drawbacks of the foam glass and show our work for improvements. The improvements are based on the understanding of the foaming mechanism (this includes chemical reactions between glass and foaming agent(s), actual foaming reaction, physical and chemical properties of the glass and their changes, etc.), which leads to a foam glass product with preferable density, pore structure and pore gas. We investigate the dependence of the thermal conductivity of the developed foams on both chemical and processing conditions and finally describe the perspectives for further improvements of the foam glass.

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