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# Nucleation kinetics of lithium disilicate glasses undercooled at various speeds

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## Abstract

The so-called statistical approach is used to analyze the nucleation kinetics of a stoichiometric lithium disilicate melts when cooled from above the melting temperature ( $T_m$ ) at various speeds. In this method, information is gained on the Poisson distributed lag-time of nucleation and the unique shape of the crystallization exotherm from  $> 200$  repetitive cooling runs of the same liquid volume at shallow undercoolings. Using a novel setup comprising of a water-cooled HT-DSC, the upper limit of the cooling speed in the temperature range from  $T_m+50$  K to  $T_m-150$  K was increased by a factor of four as compared to standard gas-cooled DSC devices, which enables us now to analyze cooling speeds of three magnitudes of order. For cooling at high speed bimodal distributed lag-times are evident which can be explained by a change in the nucleation mechanism or by nucleation at two different nucleation sites.

**Keywords:** Nucleation kinetics, LS2, DSC, statistical approach

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