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# Melt stability and fiberizing window of stone wool compositions

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## Abstract

To determine the fiberizing window of a glass melt, it is important to know the melt stability (MS), i.e., the stability of a melt against crystallization during cooling. The MS regime of a melt refers to the supercooled liquid range  $T_1 - T_c'$ , where  $T_1$  is the liquidus temperature and  $T_c'$  is the onset temperature of crystallization during cooling at a given rate. In the fiber production line, fiberization of a glass-forming melt usually takes place slightly above its liquidus temperature. In this paper, we show that  $T_c'$  could be used as the lower temperature limit for fiberizing processes. We establish a link between melts stability and melt spinnability, by which the fiberizing window of several stone wool compositions can be determined based on the viscosity-temperature relationship and the MS data. The fiberizing window is much wider compared to that determined by the traditional way. We propose a spinnability parameter ( $K_Y$ ) for describing the fiber spinnability. Furthermore we clarify the correlation between  $K_Y$  and melt fragility for several series of stone wool compositions.  $K_Y$  of each series of these compositions is inversely correlated with melt fragility and in general  $K_Y$  decreases with an increase of melt fragility. We have found an empirical constant ratio between  $T_c'$  and  $T_1$  for the studied compositions.