A MIXED-CLUSTER INTERPRETATION OF THE METASTABLE ZONE IN FLUX GROWTH [Abstract]

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Goodman's mixed-cluster model for glasses is applied to the metastable zone in fluxed melts. These are envisaged as containing two or more kinds of cluster, one being the substance about to crystallise (the primary phase), the other a compound usually formed between the primary phase and either the additive or the flux itself. The clusters are large, $10^3$ to $10^5$ ions or even more, and between them is liquid of a less ordered kind. This model is shown to account for numerous hitherto unexplained features of flux growth and to enable predictions to be made. It is compatible with the control of nucleation by surface adsorption processes, if these are considered to involve not only ionic complexes but also much larger clusters.

In previous work[1-3], the rôle of Pb$^{2+}$ as an additive to aqueous solutions in promoting the growth of few but large crystals of alkali halides has been interpreted in terms of the stabilisation of structured clusters. Recent research suggests that it may fulfil an analogous rôle in flux growth.