

Advantages and disadvantages of alumina solar glass





Overview

Is there a real alumina glass?

In 2007 we reported a sol-gel Al-lactate route to amorphous alumina (L. Zhang et al., J. Non-Cryst. Solid, 353, 1255), which recently was proven to be glassy on the atomistic level. This, to the best of our knowledge, is the first time that a real alumina glass has been obtained.

Is glassy alumina atomistic?

So far, glassy alumina was obtained only by far from equilibrium conditions, which limit their dimensions to thin films or nanoparticles. In 2007 we reported a sol-gel Al-lactate route to amorphous alumina (L. Zhang et al., J. Non-Cryst. Solid, 353, 1255), which recently was proven to be glassy on the atomistic level.

How does annealing xerogel affect alumina glass?

Subsequent annealing of the xerogel by gradual heating to 500–700 °C promotes the formation of the interconnecting Al–O–Al bonds, concomitant with the removal of the lactate ligands upon heating, resulting in pure alumina glass as the final product. A glass transition temperature (T_g) of Al₂O₃ glass was observed at ~670 °C.

Can glassy alumina be obtained by melt quenching?

Single-component Al₂O₃ atomic-level glass free of some degree of crystallinity cannot be obtained by conventional melt quenching methodology. So far, glassy alumina was obtained only by far from equilibrium conditions, which limit their dimensions to thin films or nanoparticles.



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