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To make and study the properties of glass $60Ba_2O_3.29ZnO.10BaO.CrO_x$

Project of Material Science

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Glass

1.0.1 Introduction

Glass is an inorganic amorphous solid material which can show glass transition temperature.
It means that it have no long range order , but it still has short range order. And we can say that the atoms/molecules are placed in random order without any definite lattice. And the cause for this random structure is due to the melt quenching the hot mixture of the specific molecules which we use to form glass.
Due to random structure it possesses different properties than the crystalline materials. And today it has a vast application in real life ranging from the phone screens to the bulletproof material with transparency.
Due to its random arrangement the molecules/atoms are less densely packed than in crystalline solid. And they're also trying to convert into crystalline solid when they are heated.

1.0.2 Properties of Glass

- **Amorphous in Nature :** Structure of glasses are not well-defined in long range and, but they can possess the short range order.
- **Isotropic :** All properties of a glass are same in all directions due to long range randomness then in all direction the atoms/molecules are same there is no specific atoms/molecules in one direction and other in another.
- **Brittle :** Glass are not very well-packed, so they can break into pieces when the force/load is applied on them and its is due to that there is

no grain boundary and slip planes in glass that cause it slip/deform not break into pieces.

- **Transition Temperature :** The glass can be arranged them in long range ordered manner when they are heated, or we can they convert into crystalline when they are heated and at the temperature it happens it called Transition temperature, and only glasses can have it.
- **Ability to converted into glass ceramics :** Due to transition temperature in the glass when they heated