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“Amorphous Materials”

Student *N*o. Name

1. Fill in the blank.

Amorphous – from the Greek for “( )” – refer not to materials that have no shape, but rather to materials with no ( ). The atoms or molecules of amorphous materials are arranged in essentially the same manner as they are in a ( ). An amorphous material is still solid – the molecules are closely packed and chemically bonded, and the materials exhibits an elastic response to shear stresses – but the spatial arrangement of the atoms is nearly ( ). In contrast, the building blocks of crystalline solid are arranged in orderly, 3-dimensional, periodic arrays.

Also know as non-crystalline solids, glasses, or disordered solids, amorphous materials are characterized by their ( ) rather than their composition. This is because, under the right conditions, any material can be prepared as an amorphous solid. All amorphous materials have ( ). The crystalline form will generally be more stable and chemical equilibrium, whereas the amorphous form is not.

Preparing an amorphous solid requires rapid cooing to avoid ( ). The cooling rate that constitutes rapid cooling varies with the type of material. Form metals, the speeds of cooling limit the ( ) of metallic glasses, even for the newly developed bulk metallic glasses. Many ceramics and many polymer blends are more ( ) prepared as glasses; some are ubiquitous and familiar.

Amorphous materials – whether metals, ceramics, or polymers – are characterized by a liquid-like structure. This structure is readily evident from a comparison of the ( ) of an amorphous material to that of a liquid. The structure of amorphous materials leads to distinctive properties such as transparency, plasticity, and elastic recoil.

particular structure / shape / without form / random / periodicity / phase / structure / solid / size / crystallization / easily / characterization / diffraction pattern / crystalline counterparts / hardly / liquid /

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