2010 Spring **03. 25. 2010**

"Amorphous Materials"

Class # ____________ Name ________________

1. Fill in the blank. (6 points)

1) The Johnson-Mehl-Avrami Equation describes how ( ) transform from one phase (state of matter) to another at ( ) temperature. It can specifically describe the ( ) of crystallization, can be applied generally to other changes of phase in materials, like chemical reaction rates. The physical interpretation of the JMA constants, k and n, is difficult and open to interpretation. Originally, ( ) was held to have an integer value between 1-4 which reflected the nature of the transformation in question. For example, the value of ( ) can be said to have contributions from three dimensions of growth and one representing a constant nucleation rate.

liquids / solids / amorphous / crystals / constant / high / thermodynamics / kinetics / n / k / 1 / 4 /

2) In statistical mechanics, a radial distribution function, g(r), describes how ( ) varies as a function of the ( ) from one particular atoms. Given a potential energy function, the RDF can be found either via ( ) methods like the Monte Carlo method, or via the Omstein-Zemike equation using approximative closure relations. Furthermore, it is possible to measure g(r) experimentally with ( ) or x-ray scattering diffraction data. Features in g(r) for liquids and amorphous solids are due to ( ) and possibly bonding characteristics (SRO), which the first peak corresponds to an ( ) nearest neighbor distance. And ( ) materials shows clear crystalline peaks with some background coming from the ( ).

neutron scattering/ distance/ de-bonding / packing / amorphous / nanocrystalline / crystals / total / average/ grain boundary / secondary phase / atomic density / computer simulation / experimental

2. Describe briefly various methods for preparation of surface coated amorphous phase including key factors for amorphous formation. (4 points)

*** Suggestion for class or request for personal conversation:**

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