

Answer on Question #75771, Chemistry / General Chemistry

Which has a greater entropy, $XY_2(s)$ or $XY_2(g)$? Briefly explain your answer.

Solution

Entropy may be understood as a measure of disorder within a macroscopic system.

In solid state a substance (XY_2) has more ordered structure (crystal lattice) than in liquid state, and much more ordered structure than in gaseous state. In solid state phase area of a molecule is far less than in liquid state, as little area of space between neighbor lattice sites is available for every molecule, whereas in liquid state molecules occupy the whole area of space. In gaseous state molecules also occupy the whole area of space. But the whole area for liquid state is much less than for gaseous state as there is force of interaction between molecules in liquid state that hold molecules close to each other, molecules can move inside liquid, but unable to come off the liquid, therefore the volume of liquid depends on the quantity of liquid but not on the volume of vessel. In gaseous state the distance between molecules is so big that force of interaction between molecules is small, therefore gas always occupies all volume of vessel.

Solid state, liquid state, gaseous state
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Measure of disorder increases

The greater entropy has $XY_2(g)$ in comparison with $XY_2(s)$

