

Spreading of Br₂ in Air

Equipment:

cylindrical gas jar with lid (both made of glass)
special Pasteur pipette with blunt-angled tip
and rubber cap for the transfer of bromine
white cardboard as background

Chemicals:

bromine

Safety:

bromine (Br₂):



H330 - 314 - 400

P210 - 273 - 304+340 - 305+351+338 - 308+310 - 403+233

Inhaling (breathing in) bromine vapors can be life-threatening; therefore, the experiment obligatorily has to be carried out in a fume hood. Since bromine causes severe skin burns and eye damage, it is essential to wear suitable protective gloves (made of neoprene or nitrile rubber) and safety glasses.

Procedure:

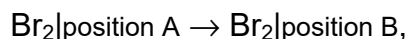
A few drops of bromine are placed on the bottom of the spacious (air-filled) gas jar by means of the special pipette and the jar is immediately closed with the lid. The white cardboard is installed behind the cylinder.

Observation:

The bromine vapor slowly spreads out in the air, which can be easily observed by its red-dish-brown color.

Explanation:

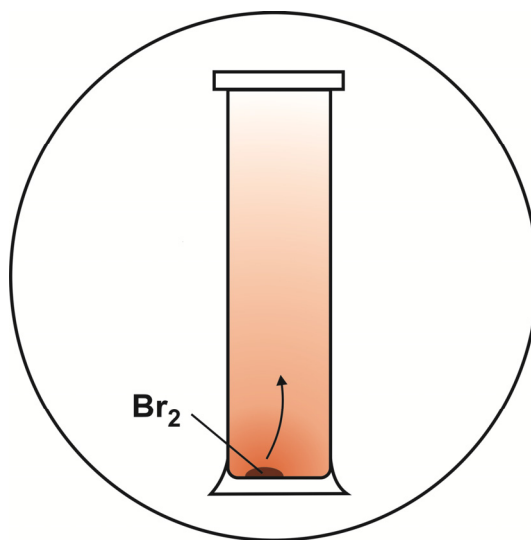
The diffusion of bromine vapor from one position to another can be considered as a reaction,



therefore it is plausible that the chemical potential also controls this process. The transport of substance always follows the direction of the potential gradient; this means that a substance migrates spontaneously only in the direction in which the μ value at the starting point is greater than at the destination. The more diluted a substance is, the lower its chemical potential; a substance therefore moves from areas of higher concentration (μ value large) into areas with lower concentration (μ value small).

Disposal:

For disposal, activated charcoal can be added to the gas jar filled with bromine vapor for adsorption. Alternatively, a few drops of saturated sodium sulfite solution can be added,



reducing bromine to bromide. The bromide containing solution is then diluted with water and disposed of down the drain.