Van der Waals' constant ′b′ of Ar is 3.22×10−5m3mol−1. Calculate the molecular diameter of Ar.

Answer:

b=4× volume occupied by the molecules in one mole of a gas

$=4\times N_0\times(4\pi r^3/3)$

$3.22\times10^{-5}=4\times6.02\times10^{23}\times(4\times3.14\times r^3/3)$

or $r=(3.22\times10-5\times3/4\times6.02\times10^{23}\times4\times3.14)^{1/3}$

$=0.1472\times10^{-9}$ m

$\therefore$Diameter$=2r=2\times0.1472\times10^{-9}$

$=0.2944\times10-9$m