Answer on Question#65189 – Chemistry – General chemistry

Question:

A 800.0 g sample of drinking water contains 0.0390 mg chlorobenzene (C6H5Cl).

(a) Express the concentration of chlorobenzene in ppm (parts per million).

WebAssign will check your answer for the correct number of significant figures. ppm

(b) What is the molality of chlorobenzene in the solution?

WebAssign will check your answer for the correct number of significant figures. m

Solution:

a)   1 ppm = 1 mg kg^{-1}

$$C(chlorobenzene) = \frac{m(chlorobenzene)}{m(sample)} = \frac{0.0390mg}{800.0g} = \frac{0.0390mg}{0.8000kg} = 0.0488 \; ppm$$

b) $C_M(chlorobenzene) = \frac{n(chlorobenzene)}{V(sample)}$

$$n(chlorobenzene) = \frac{m(chlorobenzene)}{M(chlorobenzene)} = \frac{0.0390 \; mg}{12.0\frac{g}{mol} \times 6 + 1.00\frac{g}{mol} \times 5 + 35.5\frac{g}{mol}}$$

$$= \frac{3.90 \times 10^{-5}g}{112.5\frac{g}{mol}} = 0.0347 \times 10^{-5}mol = 3.47 \times 10^{-7}mol$$

$$V(sample) = \frac{m(sample)}{\rho(sample)} = \frac{0.8000kg}{1.00\frac{kg}{L}} = 0.800L$$

$$C_M(chlorobenzene) = \frac{3.47 \times 10^{-7}mol}{0.800L} = 4.34 \times 10^{-7}\frac{mol}{L} = 4.34 \times 10^{-7}M$$

Answer:
   a)   0.0488 ppm
   b) $4.34 \times 10^{-7}M$