

## Answer on Question #54058 – Chemistry – Physical Chemistry

### Question:

How to make 10 ml mix solution of 80% NaOH and 20% KOH

### Answer:

It is only possible to prepare a solution as solid melt which contains 80% NaOH and 20 % KOH.

Densities of NaOH and KOH at 25 C° are of 2.13 g/ml and 2.14 g/ml, respectively.

$$w(\text{NaOH}) = [m(\text{NaOH})/[m(\text{NaOH})+ m(\text{KOH})]] \times 100\% = 80\%$$

The total volume can be defined:

$$10 \text{ ml} = V(\text{NaOH}) + V(\text{KOH}) = m(\text{NaOH})/2.13 + m(\text{KOH})/2.14$$

If  $m(\text{NaOH}) = x$  and  $m(\text{KOH}) = y$ , two linear equations can be written:

$$0.8 = x/(x+y) \text{ and}$$

$$10 = x/2.13 + y/2.14,$$

thus,  $x = 10 - 0.4673 y$ . After substituting  $x$  in the first equation the  $y$  is defined:

$$0.8 = (10 - 0.4673y)/(y + 10 - 0.4673y)$$

$$0.8 = (10 - 0.4673y)/(10 + 0.5327y)$$

$$8 + 0.4262y = 10 - 0.4673y$$

$$0.8935y = 2$$

$$y = 2.2384 \text{ g and } x = 10 - 0.4673 \times 2.2384 = 8.9540 \text{ g}$$

**Thus, the preparation of 10 ml of solid melt containing 80% NaOH and 20% KOH needs 8.954 g of NaOH and 2.2384 g of KOH.**