

2g

1g  $C_{95}H_{192}$

$$M_{95} = (95)(12) + (192)(1) \\ = 1332 \text{ g mol}^{-1}$$

$$n_{95} = \frac{1 \text{ g}}{1332 \text{ g mol}^{-1}} \\ = \underline{7.51 \times 10^{-4} \text{ mol}}$$

1g  $C_{105}H_{212}$

$$M_{105} = (105)(12) + (212)(1) \\ = 1472 \text{ g mol}^{-1}$$

$$n_{105} = \frac{1}{1472} \frac{\text{g}}{\text{g mol}^{-1}} \\ = \underline{6.79 \times 10^{-4} \text{ mol}}$$

Calculate 2 averages...

$$\bar{M}_n = \frac{1 + 1}{(7.51 + 6.79)(10^{-4})} = 1399 \text{ g mol}^{-1}$$

$$\bar{M}_w = \frac{(1)(1332) + (1)(1472)}{2} = 1402 \text{ g mol}^{-1}$$

$$1399 \approx 1402 \Rightarrow \text{Very little spread.}$$

Alternative

1g  $C_{10}H_{22}$

$$M_{10} = 142 \text{ g mol}^{-1}$$

$$n_{10} = 70.42 \times 10^{-4}$$

$$\bar{M}_n = 270 \text{ g mol}^{-1}$$

$$\bar{M}_w = 1402 \text{ g mol}^{-1}$$

1g  $C_{190}H_{382}$

$$M_{190} = 2662 \text{ g mol}^{-1}$$

$$n_{190} = 3.76 \times 10^{-4}$$

} more spread  
 $\Rightarrow$  wider range

1g  $C_{10}H_{22}$

same as before

1g  $C_{1000}H_{2002}$

$$M_{1000} = 14002 \text{ g mol}^{-1}$$

$$n_{1000} = 0.71 \times 10^{-4}$$

$$\bar{M}_n = 281 \text{ g mol}^{-1}$$

$$\bar{M}_w = 7072 \text{ g mol}^{-1}$$

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Bigger spread  
again  $\Rightarrow$  wider  
range.

$$\bar{M}_w \geq \bar{M}_n$$