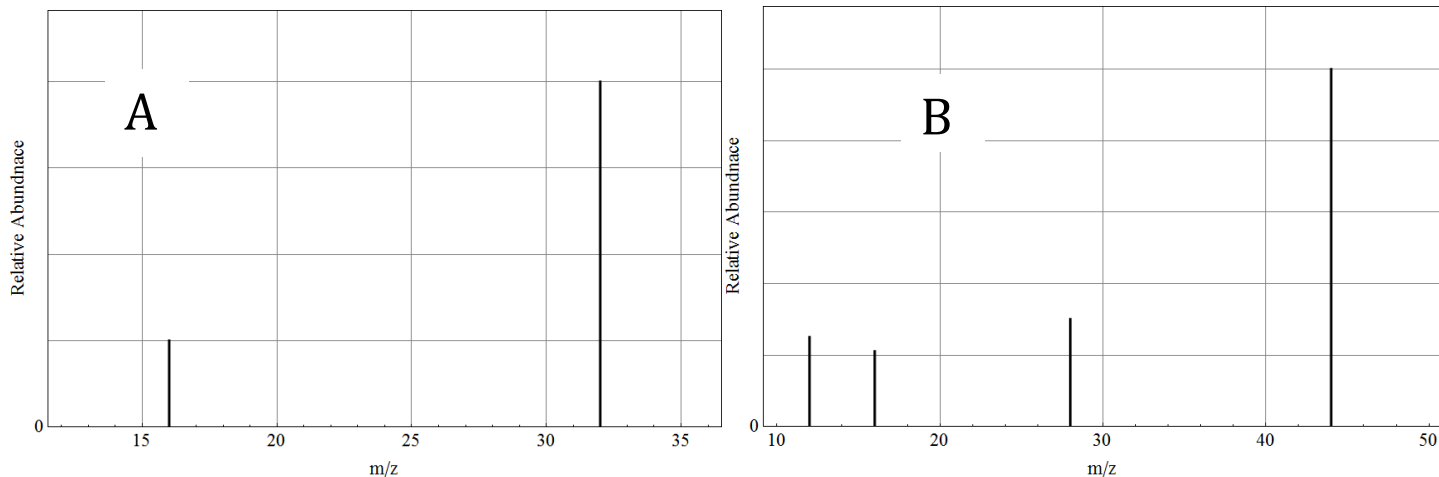


CH 101 2018 Quiz 3 Key Thursday:

1. The mass spectrum of an unknown elemental sample is taken (spectra A). This sample is reacted with pure carbon and the mass spectrum of the product is taken (spectra B).



- a. (4 points) Identify the element in A and molecule.

**A: O or O<sub>2</sub>**

**B: CO<sub>2</sub>**

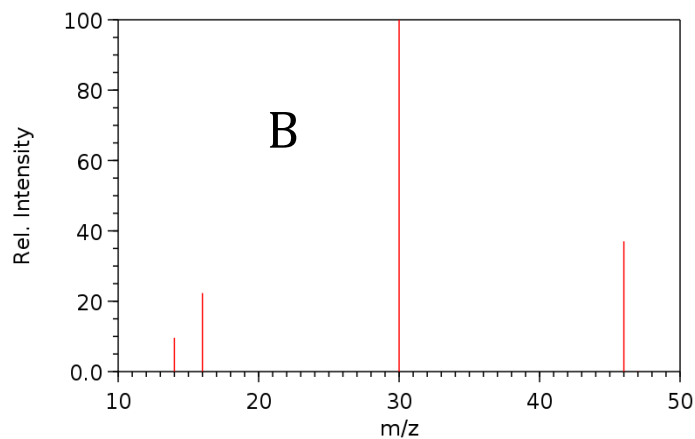
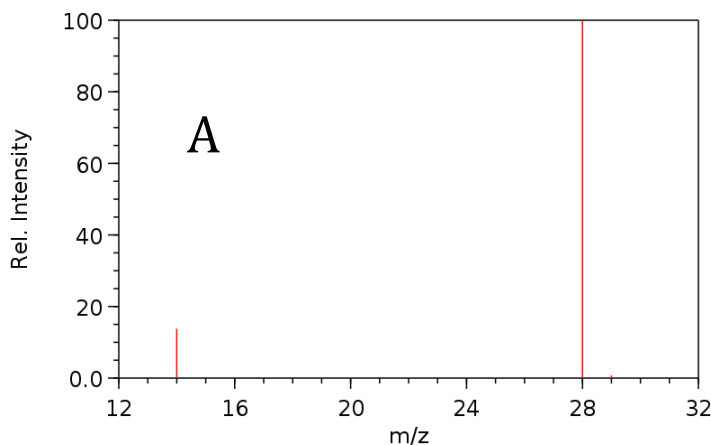
- b. (2 points) In spectra B, what does the peak at 28 m/z represent?

CO<sup>+</sup>

1. (4 points) There is an imaginary element Y with just one significant isotope, <sup>20</sup>Y, and another element A with just two isotopes, <sup>25</sup>A and <sup>28</sup>A. <sup>25</sup>A is five times as abundant as <sup>28</sup>A. Give the relative height of each of the molecular ion peaks of A<sub>2</sub>Y<sub>3</sub>, in order of increasing m/z value.
  - 2.

Relative Heights: 25:10:1

1. The mass spectrum of an unknown elemental sample is taken (spectrum A). This sample is reacted with  $O_2$  gas and the mass spectrum of the product is taken (spectrum B).



- c. (4 points) Identify the element in spectrum A and molecule in spectrum B.

**A: N or  $N_2$**

**B:  $NO_2$**

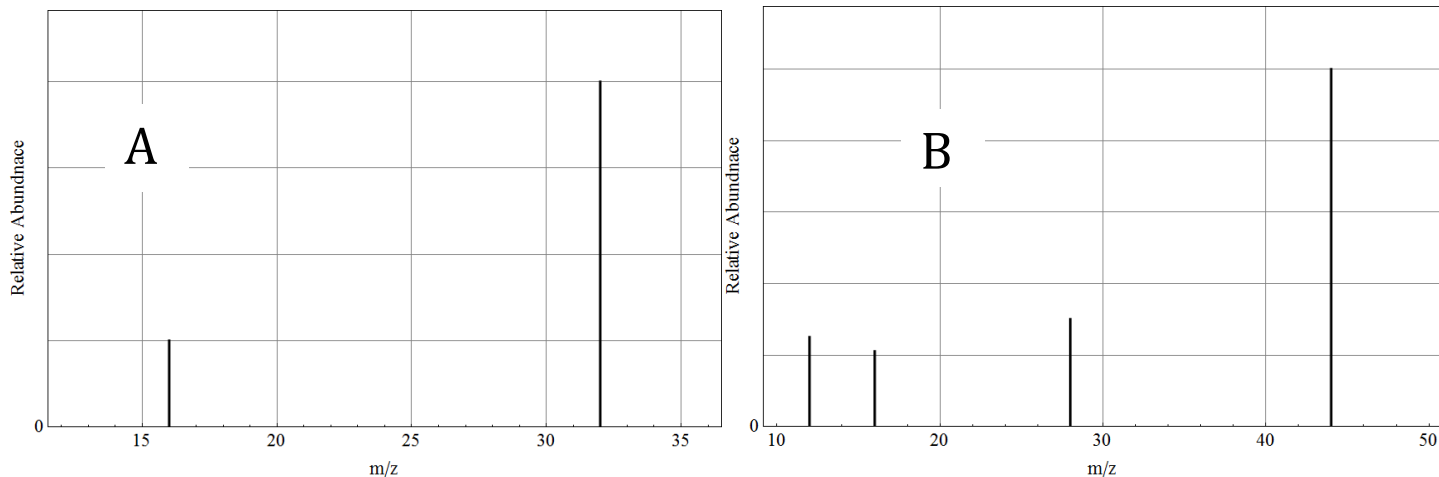
- d. (2 points) In spectrum B, what does the peak at 30 m/z represent?

**$NO^+$**

2. (4 points) There is an imaginary element Y with just one significant isotope,  $^{20}Y$ , and another element A with just two isotopes,  $^{25}A$  and  $^{28}A$ , and  $^{25}A$  is four times as abundant as  $^{28}A$ . Give the relative height of each of the molecular ion peaks of  $A_2Y_3$ , in order of increasing m/z value.

Relative Heights: 16:8:1

2. The mass spectrum of an unknown elemental sample is taken (spectra A). This sample is reacted with pure carbon and the mass spectrum of the product is taken (spectra B).



- e. (4 points) Identify the element in A and molecule.

A

B

- f. (2 points) In spectra B, what does the peak at 28  $m/z$  represent?

3. (4 points) There is an imaginary element Y with just one significant isotope,  $^{20}\text{Y}$ , and another element A with just two isotopes,  $^{25}\text{A}$  and  $^{28}\text{A}$ .  $^{25}\text{A}$  is twice as abundant as  $^{28}\text{A}$ . Give the relative height of the highest molecular ion peaks of  $\text{A}_2\text{Y}_3$ , from largest to the smallest.

Relative Heights: (largest  $m/z$ ) \_\_\_\_\_ (smallest  $m/z$ )