Following Two Oxygen Changes in Peroxide

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A class models the decomposition of hydrogen peroxide. It assigns oxidation number −1 to oxygen in H_2O_2, −2 to oxygen in water, and 0 to oxygen in elemental O_2. The equation shows four oxygen atoms in the starting molecules.

$2H_2O_2 \rightarrow 2H_2O + O_2$

1 Which product contains oxygen with a higher oxidation number than it had in peroxide?

(1) H_2O only

(2) O_2 only

(3) Both products

(4) Neither product

2 Identify the product whose oxygen is reduced. Use the given numbers to explain. [1]

Answer and work

A student compares all four oxygen atoms together. Two are in the water molecules and the other two are in the O_2 molecule.

3 Find the total increase in oxidation number for the oxygen that becomes O_2. Compare it with the total decrease for the oxygen that becomes water. [1]

Answer and work

4 A student argues that one element cannot be oxidized and reduced in the same reaction. Use the two products to evaluate that claim. [1]

Answer and work