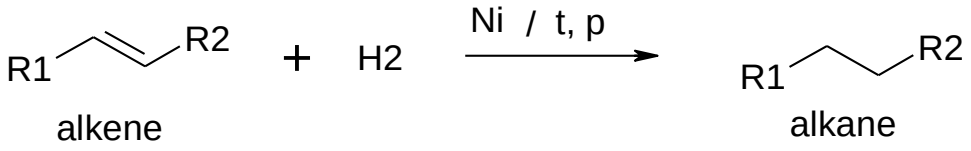
Answer on Question #57879 - Chemistry - Organic Chemistry

Task:

Alkenes react with hydrogen gas in the presence of a nickel catalyst. 0.2 mol of an alkene reacted completely with 19.2 dm^3 of hydrogen gas at room temperature and pressure. How many C=C bonds are there in a molecule of this alkene?

Solution:

We write the equation, which elapses between alkene and hydrogen gas in the presence of a nickel catalyst



From the reaction of the equation it can be seen that for recovery of an alkene with a unsaturated (double) C=C bond requires 1 mol of hydrogen gas (H_2).

Whereas alkene that has **N** C=C bonds need **N** mol H_2.

It is known that 1 mol of any gas occupies the same volume. This volume is equal to 22.4 dm^3.

Consequently,

1 mol of an alkene, which has a **N** C=C bonds -- **N** × 22.4 dm^3;

0.2 mol of an alkene, which has a **N** C=C bonds – 19.2 dm^3.

N × 22.4 dm^3 × 0.2 mol = 19.2 dm^3 × 1 mol

N = 19.2 × 1 / (22.4 × 0.2) = 4.28.

So, alkene contains 4 C=C bonds.

Answer:

4 C=C bonds are there in a molecule of this alkene.