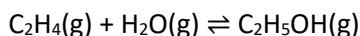


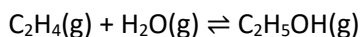
Green Chemistry

1. Ethanol is produced on an industrial scale according to the addition reaction shown below.



Given that 5.00 mol of ethene gas was placed in the reaction chamber with excess water vapour, calculate the mass of ethanol produced, if the percentage yield for this reaction is 56%.

2. Ethanol is produced on an industrial scale according to the addition reaction shown below.



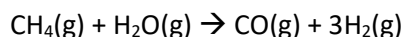
Calculate the percentage yield of the reaction, under certain conditions, given that 2.80 mol of ethene gas was placed in the reaction chamber with excess water vapour to produce 1.00 mol of ethanol.

3. Calcium oxide is produced by the thermal decomposition of limestone according to equation below.

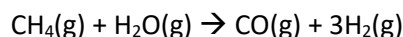


What is the percentage yield of this process if 60.0 grams of CaCO_3 (formula mass 100 g/mol) produces 30.0 grams of calcium oxide (formula mass 56.0 g/mol)?

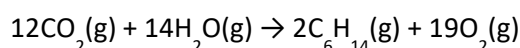
4. Hydrogen gas is produced by a process called **steam reformation**. In this process methane reacts with super-hot steam to form carbon monoxide and hydrogen gas according to the balanced chemical equation below. Find the percent atom economy for the formation of hydrogen gas using this method.



5. Carbon monoxide gas is produced by a process called **steam reformation**. In this process methane reacts with super-hot steam to form carbon monoxide and hydrogen gas according to the balanced chemical equation below. Find the percent atom economy for the formation of carbon monoxide gas using this method.



6. Butane is burnt as a fuel on a particular space station. The CO_2 and H_2O produced are then used to regenerate O_2 gas using solar energy according the equation below.



What is the percentage atom economy of the production of oxygen gas according to the reaction above?