

JQ.3.2.Setup

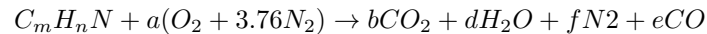
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(3.2) Propane and air are supplied to a combustion chamber so that 20 g/s of propane reacts. the reaction forms H_2O , CO_2 , H_2 and CO where the molar ratio of CO to CO_2 is 0.1. The exhaust gases flow at a rate of 360 g/s. Assuming the process is steady and conditions are uniform at the exit, compute the exit mass fraction of the CO .

Setup:

First sketch a three port reactor with fuel and air inlets and a product outlet. Recognize that the three port system also represents a chemical reaction:

Balance the stoichiometric case using the constraint relationship between CO_2 and CO .



For the stoichiometric case, find out how much air will be required to consume 20 g/s of propane.

Will this cause 360 g/s of product to flow out? Decide how much air is needed. Calculate the mass fraction of CO on the right hand side of the chemical balance equation.

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