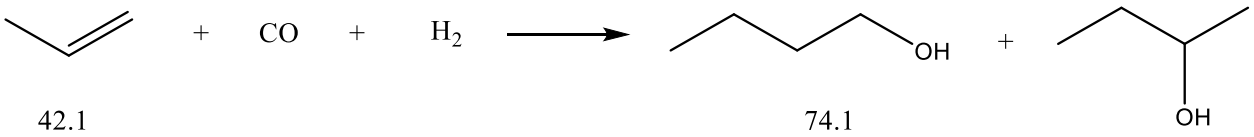
Exercise 5

The following hydroformylation process uses 609 kg/h propene, 406 kg/h CO and 58 kg/h H2 to obtain 1000 kg/h n-butanol and 50 kg/h isopropanol. The process also requires 208 kW electricity and heating power (steam) of 630 kW.

What is the yield of the desired n-butanol and the energy intensity referred to n-butanol?



42.1 74.1

$$\boldsymbol{Yield = \frac{1000/74.1}{609/42.1} = 93.3\%}$$

$$\boldsymbol{Power = 208 + 630 = 838\ kW}$$

$$\boldsymbol{Energy\ intensity = \frac{838[kW]}{(1000/3600)[kg \cdot s^{-1}]} = 3\ MJ \cdot kg^{-1}}$$