Aspirin, C9H8O4, is produced from salicylic acid, C7H6O3, and acetic anhydride, C4H6O3, as shown below.

C7H6O3 + C4H6O3 C9H8O4 + HC2H3O2
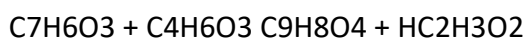
How much salicylic acid is required to produce 2.4 102 kg of aspirin, assuming that all of the salicylic acid is converted to aspirin?

How much salicylic acid would be required if only 67% of the salicylic acid is converted to aspirin?

What is the theoretical yield of aspirin if 181 kg of salicylic acid is allowed to react with 153 kg of acetic anhydride?

If the situation described in part (c) produces 159 kg of aspirin, what is the percentage yield?

Due to inaccuracies in the question, the answer is not complete

Question: what is the theoretical yield of aspirin if 181 kg of salicylic acid is allowed to react with 153 kg of acetic anhydride?

Solution:

$n(C7H6O3) = \dfrac{181000g}{138.12 \text{ g/mol}} = 1310.45 \text{ mol}$

$n(C4H6O3) = \dfrac{153000g}{102.09 \text{ g/mol}} = 1498.67 \text{ mol}$

n(C9H8O4) = 1310.45 mol

m(C9H8O4) = n · M = 1310.45 mol · 180.157 = 236086.7 g = 236.0867 kg

Answer: 236.0867 kg