C7H6O3 + CH3COOH —> C9H8O4 + H2O
The above reaction between salicylic acid (C7H6O3) and acetic acid shows the synthesis of aspirin (C9H8O4). If the percent yield of the reaction is 33.3% then what mass of aspirin could be recovered from the reaction of 18.8 g of salicylic acid?

Solution:

1.$n = \frac{m}{M}$;

M($C_7H_6O_3$)=138$\frac{g}{mole}$;

n($C_7H_6O_3$)=$\frac{18.8\ g}{138\frac{g}{mole}}$=0.14 mole;

2.n($C_9H_8O_4$)=n($C_7H_6O_3$).It is from the equation of reaction;

3.m=n×M;

M($C_9H_8O_4$)=180$\frac{g}{mole}$;

m($C_9H_8O_4$)=0.14 mole ×180$\frac{g}{mole}$=25.2 g;

4.$\eta = \frac{m(practical)}{m(theoretical)} \times 100\%$;

$m(practical) = \frac{\eta \times m(theoretical)}{100\%}$;

$m(\mathrm{C_9H_8O_4 practical}) = \frac{33.3\% \times 25.2\mathrm{g}}{100\%} 8.4\mathrm{g}$;

Answer: $m(\mathrm{C_9H_8O_4 practical})$is $8.4\mathrm{g}$.