

APPENDIX B – GRAVIMETRIC CALCULATIONS (FOR HEATING IN INERT CONDITIONS)

Cobalt acetate dihydrate:

Molar mass = 213 g.mol⁻¹

1 mol CoO = 75 g.mol⁻¹

Expected mass loss % for CoO formation: $100 - (75/213 \text{ g.mol}^{-1} \times 100\%) = \mathbf{64.8\%}$

Similarly, 1 mol Co = 59 g.mol⁻¹

Expected mass loss % for Co formation: $100 - (59/213 \text{ g.mol}^{-1} \times 100\%) = 72.3\%$

Thus the observed mass loss (62.4%) corresponds to the expected mass loss % for CoO formation

Cobalt propionate:

Molar mass = 205 g.mol⁻¹

1 mol CoO = 75 g.mol⁻¹

Expected mass loss % for CoO formation: $100 - (75/205 \text{ g.mol}^{-1} \times 100\%) = 63.4\%$

Similarly, 1 mol Co = 59 g.mol⁻¹

Expected mass loss % for Co formation: $100 - (59/205 \text{ g.mol}^{-1} \times 100\%) = \mathbf{71.2\%}$

Thus the observed mass loss (72.2%) corresponds to the expected mass loss % for Co formation

Cobalt butyrate:

Molar mass = 233 g.mol⁻¹

1 mol CoO = 75 g.mol⁻¹

Expected mass loss % for CoO formation: $100 - (75/233 \text{ g.mol}^{-1} \times 100\%) = \mathbf{67.8\%}$

Similarly, 1 mol Co = 59 g.mol⁻¹

Expected mass loss % for Co formation: $100 - (59/233 \text{ g.mol}^{-1} \times 100\%) = 74.7\%$

Thus the observed mass loss (77.1%) corresponds to the expected mass loss % for Co formation

Cobalt valerate:

Molar mass = 261 g.mol⁻¹

1 mol CoO = 75 g.mol⁻¹

Expected mass loss % for CoO formation: $100 - (75/261 \text{ g.mol}^{-1} \times 100\%) = 71.3\%$

Similarly, 1 mol Co = 59 g.mol⁻¹

Expected mass loss % for Co formation: $100 - (59/261 \text{ g.mol}^{-1} \times 100\%) = \mathbf{77.4\%}$

Thus the observed mass loss (77.3%) corresponds to the expected mass loss % for Co formation

Cobalt hexanoate:

Molar mass = 289 g.mol⁻¹

1 mol CoO = 75 g.mol⁻¹

Expected mass loss % for CoO formation: $100 - (75/289 \text{ g.mol}^{-1} \times 100\%) = \mathbf{74.0\%}$

Similarly, 1 mol Co = 59 g.mol⁻¹

Expected mass loss % for Co formation: $100 - (59/289 \text{ g.mol}^{-1} \times 100\%) = 79.6\%$

Thus the observed mass loss (71.0%) corresponds to the expected mass loss % for CoO formation

Cobalt heptanoate:

Molar mass = 317 g.mol⁻¹

1 mol CoO = 75 g.mol⁻¹

Expected mass loss % for CoO formation: $100 - (75/317 \text{ g.mol}^{-1} \times 100\%) = \mathbf{76.3\%}$

Similarly, 1 mol Co = 59 g.mol⁻¹

Expected mass loss % for Co formation: $100 - (59/317 \text{ g.mol}^{-1} \times 100\%) = 81.4\%$

Thus the observed mass loss (76.1%) corresponds to the expected mass loss % for CoO formation

Cobalt octanoate:

Molar mass = 345 g.mol⁻¹

1 mol CoO = 75 g.mol⁻¹

Expected mass loss % for CoO formation: $100 - (75/345 \text{ g.mol}^{-1} \times 100\%) = \mathbf{78.3\%}$

Similarly, 1 mol Co = 59 g.mol⁻¹

Expected mass loss % for Co formation: $100 - (59/345 \text{ g.mol}^{-1} \times 100\%) = 82.9\%$

Thus the observed mass loss (71.2%) corresponds more closely to the expected mass loss % for CoO formation

Cobalt nonanoate:

Molar mass = 373 g.mol⁻¹

1 mol CoO = 75 g.mol⁻¹

Expected mass loss % for CoO formation: $100 - (75/373 \text{ g.mol}^{-1} \times 100\%) = \mathbf{79.9\%}$

Similarly, 1 mol Co = 59 g.mol⁻¹

Expected mass loss % for Co formation: $100 - (59/373 \text{ g.mol}^{-1} \times 100\%) = 84.2\%$

Thus the observed mass loss (77.8%) corresponds to the expected mass loss % for CoO formation

Cobalt decanoate:

Molar mass = 401 g.mol⁻¹

1 mol CoO = 75 g.mol⁻¹

Expected mass loss % for CoO formation: $100 - (75/401 \text{ g.mol}^{-1} \times 100\%) = \mathbf{81.3\%}$

Similarly, 1 mol Co = 59 g.mol⁻¹

Expected mass loss % for Co formation: $100 - (59/401 \text{ g.mol}^{-1} \times 100\%) = 85.5\%$

Thus the observed mass loss (82.6%) corresponds to the expected mass loss % for CoO formation