

For barium chromate, the equivalence point is 20 mL Ba^{+2} and 4946 mg barium carbonate.

20 mL of a 1.0 M solution corresponds to 0.020 moles of Ba^{+2}

0.020 moles Ba^{+2} corresponds to $0.020 \text{ mol} \times 137.33 \text{ g/mol} = 2.74 \text{ g Ba}^{+2}$

4946 mg = 4.946 g barium chromate

$4.946 \text{ g} - 2.746 \text{ g} = 2.200 \text{ g chromate}$

$2.200 \text{ g}/116 \text{ g/mol} = 0.190 \text{ moles chromate}$

The mole ratio is approximately 1:1, so the formula is BaCrO_4

For iron hydroxide, the equivalence points seems to be 24 mL and 1065 mg

24 mL of a 1.0 M solution corresponds to a 0.0240 moles Fe^{+2}

0.0240 moles Fe^{+2} corresponds to $0.0240 \text{ mol} \times 55.85 \text{ g/mol} = 1.34 \text{ g Fe}^{+2}$, which is more than the amount of product, so the Fe^{+2} is in excess.

If, however, you have 24 mL of a 0.5 M solution of Fe^{+2} :

24 mL of a 0.5 M solution corresponds to 0.0120 moles Fe^{+2}

$0.0120 \text{ moles} \times 55.85 \text{ g/mol} = 0.670 \text{ g Fe}^{+2}$

$1.065 \text{ g} - 0.0670 \text{ g} = 0.395 \text{ g OH}^-$

$0.395/17 \text{ g/mol} = 0.023 \text{ moles hydroxide}$

The mole ratio is approximately 1:2, so the formula is $\text{Fe}(\text{OH})_2$

