

Example skipped in Stoichiometry Notes

Stoichiometry Example

Consider the preparation of titanium metal:



If 2.55 kg of titanium (IV) chloride is reacted with 1.00 kg of magnesium metal,

A. What is the limiting reagent?

a) TiCl_4

B. What is the theoretical yield of titanium?

b) 644 g Ti

C. What mass of excess reagent remains?

c) 350 g Mg remains

A) & B)

2.55 kg TiCl_4	1000 g	1 mol TiCl_4	1 mol Ti	47.90 g Ti	= 644 g Ti
	kg	189.67 g TiCl_4	1 mol TiCl_4	1 mol Ti	

smaller value from L.R.

1.00 kg Mg	1000 g	1 mol Mg	1 mol Ti	47.90 g Ti	= 985 g Ti
	kg	24.31 g Mg	2 mol Mg	1 mol Ti	

from excess reagent

c)

2550 g TiCl_4	1 mol TiCl_4	2 mol Mg	24.31 g Mg	= 654 g Mg reacts
	189.67 g TiCl_4	1 mol TiCl_4	1 mol Mg	

1000 g Mg start - 654 g Mg reacts
 = 346 g = 350 g Mg remains