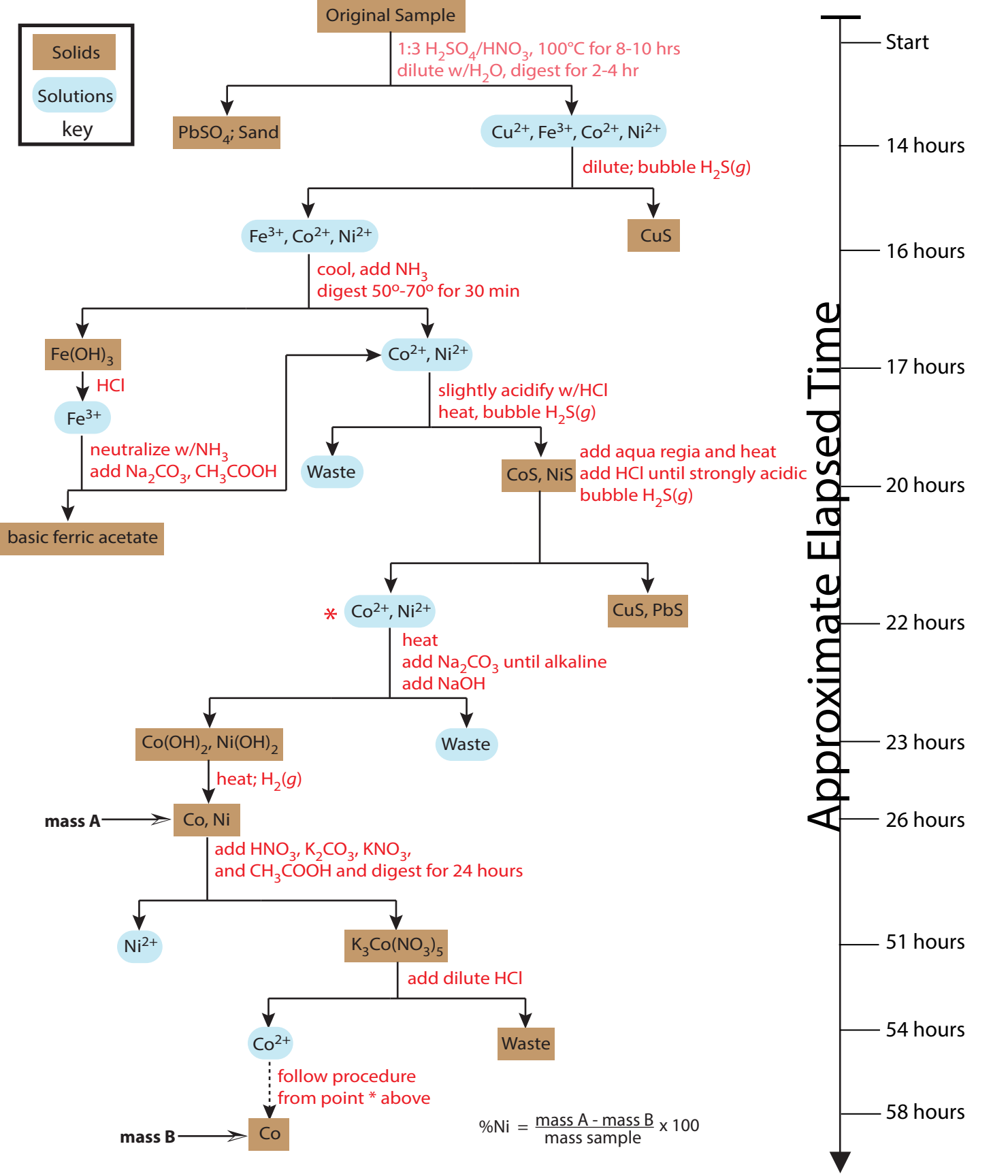
Solids
Solutions
key
Original Sample
1:3 H_2SO_4/HNO_3, 100°C for 8-10 hrs
dilute w/H_2O, digest for 2-4 hr
$PbSO_4$; Sand
Cu^{2+}, Fe^{3+}, Co^{2+}, Ni^{2+}
dilute; bubble $H_2S(g)$
Fe^{3+}, Co^{2+}, Ni^{2+}
CuS
cool, add NH_3
digest 50°-70° for 30 min
$Fe(OH)_3$
HCl
Fe^{3+}
neutralize w/NH_3
add Na_2CO_3, CH_3COOH
basic ferric acetate
Co^{2+}, Ni^{2+}
slightly acidify w/HCl
heat, bubble $H_2S(g)$
Waste
CoS, NiS
add aqua regia and heat
add HCl until strongly acidic
bubble $H_2S(g)$
* Co^{2+}, Ni^{2+}
CuS, PbS
heat
add Na_2CO_3 until alkaline
add NaOH
$Co(OH)_2$, $Ni(OH)_2$
Waste
heat; $H_2(g)$
mass A
Co, Ni
add HNO_3, K_2CO_3, KNO_3,
and CH_3COOH and digest for 24 hours
Ni^{2+}
$K_3Co(NO_3)_5$
add dilute HCl
Co^{2+}
Waste
follow procedure
from point * above
mass B
Co
$\%Ni = \frac{\text{mass A - mass B}}{\text{mass sample}} \times 100$
Approximate Elapsed Time
Start
14 hours
16 hours
17 hours
20 hours
22 hours
23 hours
26 hours
51 hours
54 hours
58 hours