CHEM 1423
Chapter 23
Homework Questions

TEXTBOOK HOMEWORK

23.6 Write balanced nuclear equations for the following:
(a) Alpha decay of $_{92}^{234}U$
(b) Electron capture by Neptunium-232
(c) Positron emission by $_{7}^{12}N$

23.8 Write balanced nuclear equations for the following:
(a) Formation of $_{22}^{48}Ti$ through positron emission
(b) Formation of silver-107 through electron capture
(c) Formation of polonium-206 through α decay

23.9 Write balanced nuclear equations for the following:
(a) Formation of $_{95}^{241}Am$ through β^- decay
(b) Formation of $_{89}^{228}Ac$ through β^- decay
(c) Formation of $_{83}^{201}Bi$ through α decay

23.12 What is the most likely mode of decay for each?
(a) $_{92}^{238}U$
(b) $_{24}^{48}Cr$
(c) $_{25}^{50}Mn$

23.13 What is the most likely mode of decay for each?
(a) $_{47}^{111}Ag$
(b) $_{17}^{41}Cl$
(c) $_{44}^{110}Ru$

23.34 Name the unidentified species, and write a balanced nuclear equation for each transmutation:
(a) gamma irradiation of a nuclide yields a proton, a neutron, and ^{29}Si
(b) bombardment of ^{252}Cf with ^{10}B yields five neutrons and a nuclide
(c) bombardment of ^{238}U with a particle yields three neutrons and ^{239}Pu

SUPPLEMENTARY HOMEWORK

S1. Use the nuclear mass table (at bottom) to calculate (a) the Binding Energy, and (b) the Binding Energy per nucleon for each of the following nuclei (in kJ/mol).

a. ^{31}P

b. ^{190}Os

c. ^{239}Pu

S2. Use the nuclear mass table (at bottom) to calculate ΔE for the following nuclear reactions, in kJ/mol

a. $^{235}_{92}U + ^{1}_{0}n \rightarrow ^{138}_{56}Ba + ^{86}_{36}Kr + 12\,^{1}_{0}n$

b. $^{2}_{1}H + ^{3}_{1}H \rightarrow ^{4}_{2}He + ^{1}_{0}n$

c. $^{7}_{3}Li + ^{1}_{1}H \rightarrow ^{1}_{0}n + ^{7}_{4}Be$

Nucleus	Atomic Mass	
$_1{}^1$H	1.008	g/mol
$_0{}^1$n	1. 009	
$_1{}^2$H	2.014	
$_1{}^3$H	3.016	
$_2{}^4$He	4.003	
^{7}Li	7.016	
^{7}Be	7.017	
^{31}P	30.974	
^{86}Kr	85.910	
^{138}Ba	137.911	
^{190}Os	189.958	
^{235}U	235.044	
^{239}Pu	239.052	