Name _____ Period _____

CP Chemistry of the Earth

Assignment 4P – Double Replacement Reaction Review 20 Points

Complete the following double replacement chemical reactions, including showing the cross method and all work. No Work = No Credit!

Al_2S_3 | S_3

A | B

Al | S

Fe | Br_2

C | D

Fe | Br

only symbols or ions!

Reaction	Al: (13) [+3] Fe: +2 (trans.) $Al_2S_3 + FeBr_2 \rightarrow$ [Fe = +2]						Double Replace Rxn
General Form	**AB**	+	**CD**	→	**AD**	+	**CB**
Reaction	Al_2S_3	+	$FeBr_2$	→	$AlBr_3$	+	FeS

A	**D**	**AD**	**C**	**B**	**CB**
Element Poly Ion	Element Poly Ion	Cross Method	Element Poly Ion	Element Poly Ion	Cross Method
Al	Br	+3 −1 → $AlBr_3$	Fe	S	+2 −2 → FeS
Charge (group 13) +3	Charge (group 17) −1		Charge (given) +2	Charge (group 16) −2	

Reduce! Fe_2S_2 → FeS_1

Elements Ti, S, O

Ti | $(S_2O_3)_2$

A | B

Ti | S_2O_3

S_2O_3 is a poly. ion

Charge* polyion

use chart!

given charges!

Reaction	$Ti(S_2O_3)_2 + CoCr_2O_7 \rightarrow$ [Ti = +4, Co = +2]						
General Form	**AB**	+	**CD**	→	**AD**	+	**CB**
Reaction	$Ti(S_2O_3)_2$	+	$CoCr_2O_7$	→	$Ti(Cr_2O_7)_2$	+	CoS_2O_3

Co | Cr_2O_7

C | D

Co | Cr_2O_7

no ( ) Use all!

A	**D**	**AD**	**C**	**B**	**CB**
Element Poly Ion	Element Poly Ion	Cross Method	Element Poly Ion	Element Poly Ion	Cross Method
Ti	Cr_2O_7	+4 −2 → $Ti(Cr_2O_7)$	Co	S_2O_3	+2 −2 → $Co(S_2O_3)$
Charge (given) +4	Charge* −2	$Ti(Cr_2O_7)_2$	Charge (given) +2	Charge* −2	CoS_2O_3

Don't Forget ( )! min work!

Reduce: $Ti_2(Cr_2O_7)_4$

$Co_2(S_2O_3)_2$

Reaction	$HCl + Ni(OH)_3 \rightarrow$ [Ni = +3]						
General Form	**AB**	+	**CD**	→	**AD**	+	**CB**
Reaction		+		→		+	

A	**D**	**AD**		**C**	**B**	**CB**
Element Poly Ion	Element Poly Ion	Cross Method		Element Poly Ion	Element Poly Ion	Cross Method
Charge	Charge			Charge	Charge	

Acid

H_2 | CO_3

A | B

H | CO_3

poly ion

Reaction	$H_2CO_3 + Cu(OH)_3 \rightarrow$ [Cu = +3] (Charge)						
General Form	**AB**	+	**CD**	→	**AD**	+	**CB**
Reaction	H_2CO_3	+	$Cu(OH)_3$	→	HOH	+	$Cu_2(OH)_3$

Base

Cu | $(OH)_3$

C | D

Cu | OH

base poly ion

A	**D**	**AD**		**C**	**B**	**CB**
Element Poly Ion	Element Poly Ion	Cross Method		Element Poly Ion	Element Poly Ion	Cross Method
H	OH	+1 -1		Cu	CO_3	+3 -2
Charge (chart)	Charge (poly)	$H(OH)$		Charge (given)	Charge (poly)	$Cu(CO_3)$
+1	−1	HOH		+3	−2	$Cu_2(CO_3)_3$

min work!

(Always HOH = H_2O, water)