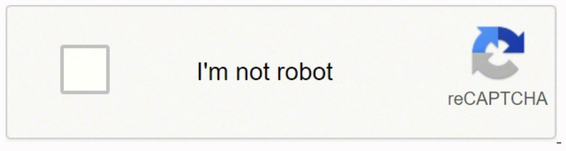

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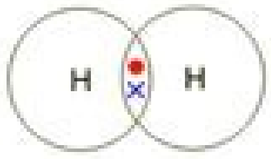
Chemistry chemical bond worksheet answers

Covalent bonding

Molecule	Molymod model	Dot and cross diagram
Example: H_2		
Cl_2		
HCl		
H_2O		
CH_4		

Name [redacted] Period [redacted]

Transition Metals and Polyatomic Ions Packet

94/94

CB: C

Part A Write the formula for each ionic compound.

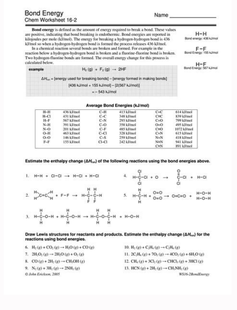
	Name	Formula
1.	Tin (II) Hydroxide	$Sn(OH)_2$
2.	Iron (III) oxalate	$Fe_2(C_2O_4)_3$
3.	Colbalt (II)-bromide	$CoBr_2$
4.	Chromium (III) Chloride	$CrCl_3$
5.	Iron (II) Oxide	FeO
6.	Mercury (II) Chloride	$HgCl_2$
7.	Tin (IV) Sulfide	SnS_2
8.	Silver (I) Phosphide	Ag_3P
9.	Lead (IV) Iodide	PbI_4

Part B Write the Name for each formula
Be sure to include the roman numeral.

	Formula	Name
1.	$Fe(NO_3)_3$	Iron (III) nitrate
2.	$Mn(OH)_2$	Manganese (II) Hydroxate
3.	$Ti(NO_3)_4$	~~Tin~~ Titanium (IV) Nitrate
4.	PbS_2	Lead (IV) Sulfide
5.	$CuCl$	Copper (I) Chloride
6.	$PbSO_4$	Lead (II) Sulfate
7.	$ZnCl_2$	Zinc Chloride
8.	Hg_2O	Mercury (I) oxide
9.	Cr_2O_3	Chromium (III) oxide

Part C: Fill in the following table. Polyatomic ions and transition metals are mixed up.

	Ionic Formula	Ionic Compound Name	Balanced Ion Pairs
1.	Na_2CrO_4	Sodium Chromate	$Na^+ CrO^{-2}$
2.	$CuCl$	Copper Chloride	$Cu^+ Cl^-$
3.	$NaNO_3$	Sodium Nitrate	$Na^+ NO_3^-$
4.	$ZnSO_4$	Zinc (II) Sulfate	$Zn^{+2} SO_4$
5.	KCN	Potassium cyanide	$K^+ CN^-$
6.	Al_2O_3	Aluminum Oxide	$Al^{+3} O^{-2}$
7.	$Cu(NO_3)_2$	Copper(II) nitrate	$Cu(NO_3)_2$
8.	$FePO_4$	Iron(III) Phosphide	$Fe PO_4^{-3}$
9.	PbS	Lead(II) sulfide	$Pb^{+2} S^{-2}$
10.	$NaClO$	Sodium Hydrochloride	$Na^+ ClO^-$
11.	Na_2CO_3	Sodium Carbonate	$Na^+ CO_3^{-2}$
12.	Na_2SeO_4	Sodium Sulfate	$Na^+ Se O_4^{-2}$
13.		Ammonium Bromate	$NH_4^+ BO_3^-$
14.	$Au(ClO_4)_3$	Gold Perchlorate	$Au^{+3} (ClO_4)_3^-$
15.	Fe_2S_3	Iron(III) Sulfate	$Fe^{+3} S^{+2}$



Bond Energy
Chem Worksheet 16-2

Name _____

Bond energy is defined as the amount of energy required to break a bond. These values are positive, indicating that bond breaking is endothermic. Bond energies are reported in kilojoules per mole (kJ/mol). For example, the bond energy of a hydrogen bond is 436 kJ/mol, so when a hydrogen-hydrogen bond is formed the process releases 436 kJ/mol.

In a chemical reaction several bonds are broken and formed. For example in the reaction between hydrogen and fluorine, hydrogen bonds and fluorine bonds are broken. Then hydrogen-fluorine bonds are formed. The overall energy change for this process is calculated below.

H–H
Bond Energy: 436 kJ/mol

F–F
Bond Energy: 156 kJ/mol

H–F
Bond Energy: 567 kJ/mol

example

$H_2(g) + F_2(g) \rightarrow 2HF$

ΔH_{rxn} = [energy used for breaking bonds] – [energy formed in making bonds]
[436 kJ/mol + 156 kJ/mol] – [2(567 kJ/mol)]
= -542 kJ/mol

Average Bond Energies (kJ/mol)

H–H	436 kJ/mol	C–H	413 kJ/mol	C=C	614 kJ/mol
N–O	631 kJ/mol	C–C	348 kJ/mol	C≡C	839 kJ/mol
N–N	163 kJ/mol	C–O	358 kJ/mol	C=O	799 kJ/mol
N–H	391 kJ/mol	C–O	799 kJ/mol	O=O	495 kJ/mol
O–O	146 kJ/mol	C–N	308 kJ/mol	C=N	615 kJ/mol
O–H	463 kJ/mol	C–Cl	330 kJ/mol	C≡N	813 kJ/mol
O–F	190 kJ/mol	C–Br	275 kJ/mol	N=O	607 kJ/mol
F–F	159 kJ/mol	C–I	241 kJ/mol	N≡N	941 kJ/mol
				C≡N	891 kJ/mol

Estimate the enthalpy change (ΔH_{rxn}) of the following reactions using the bond energies above.

1. $H{-}H + O{=}O \rightarrow H{-}O{-}O{-}H$

2.

3.

4.

5.

Draw Lewis structures for reactants and products. Estimate the enthalpy change (ΔH_{rxn}) for the reactions using bond energies.

6. $H_2(g) + CO_2(g) \rightarrow H_2O(g) + CO(g)$
7. $2H_2S_{(g)} + 3O_2(g) \rightarrow 2H_2O(g) + 2S_{(g)}$
8. $CO(g) + 2H_2(g) \rightarrow CH_3OH(g)$
9. $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
10. $H_2(g) + C_2H_2(g) \rightarrow C_2H_4(g)$
11. $2CH_4(g) + 3O_2(g) \rightarrow 4CO_2(g) + 6H_2O(g)$
12. $CH_4(g) + 3Cl_2(g) \rightarrow CHCl_3(g) + 3HCl(g)$
13. $HCN(g) + 2H_2(g) \rightarrow CH_3NH_2(g)$

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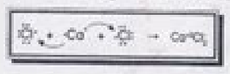
IONIC BONDING

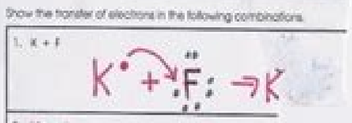
Ionic bonding occurs when a metal transfers one or more electrons to a nonmetal in an effort to attain a stable octet of electrons. For example, the transfer of an electron from sodium to chlorine can be depicted by a Lewis dot diagram.

Calcium would need two chlorine atoms to get rid of its two valence electrons.



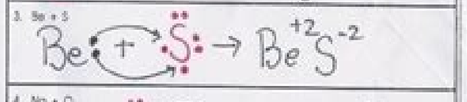
Show the transfer of electrons in the following combinations.

1. K + F

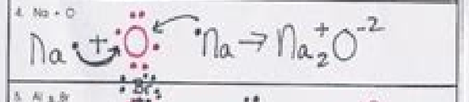


2. Mg + I

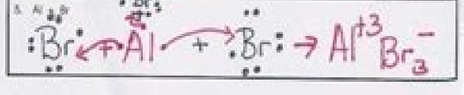
3. Be + S



4. Na + O



5. Al + Br



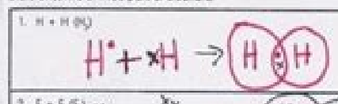
COVALENT BONDING

Name _____

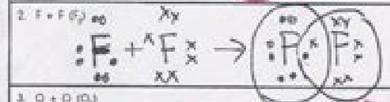
Covalent bonding occurs when two or more nonmetals share electrons, attempting to attain a stable octet of electrons at least part of the time. For example:

Show how covalent bonding occurs in each of the following pairs of atoms. Atoms may share one, two or three pairs of electrons.

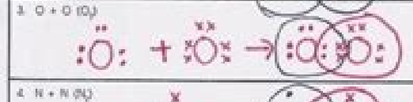
1. H + H (H_2)



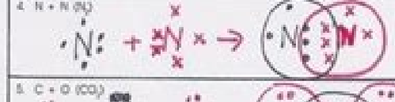
2. F + F (F_2)



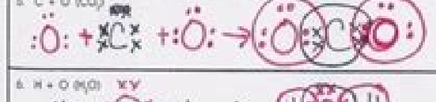
3. O + O (O_2)



4. N + N (N_2)



5. C + O (CO_2)



6. H + O (H_2O)

Chemical Bonding Worksheet

Ionic Bond	between a Metal and Non-Metal	(M + NM)
Covalent Bond	between a Non-Metal and Non-Metal	(NM + NM)
Metallic Bond	between a Metal and Metal	(M+ M)

Determine if the elements in the following compounds are metals or non-metals. Describe the type of bonding that occurs in the compound.

Compound	Element 1 (metal or non-metal?)	Element 2 (metal or non-metal?)	Bond Type
NO_2	N = non-metal	O = non-metal	covalent
NaCl			
SO_2			
PO_4^{3-}			
$MgBr_2$			
CaO			
H_2O			
K_2O			
Cu-Zn alloy			
O_2			
$CuCl_2$			
NO_2^-			
TiO_2			
HF			
Rb_2S			
Au-Ag mixture			
Fe_2O_3			
$C_6H_{12}O_{22}$			

What is a chemical bond *. What is a chemical bond easy definition. Chemical bond answer key. Chemical bonding worksheet answer. What is a chemical bond short answer.

Step 3: The last thing you need to complete the Formula is to put the remaining 6 elés around the oxygen. That is why the composite ammans nitrate is written as NH4NO3 instead of N2H4O3. A chemical connection is formed when the Eléms are shared between two arts. Name: _____ Seção: _____ Student ID #: _____ Work in groups in these problems. Define a polar-covalent connection. Be able to calculate the load in an article, given the electronics point of electronics. Step 5: Now all you need to do is put the remaining 4 elães in oxygen. Structural Formulas show the articles in their correct placement in the molemple. The formal charge for each oxygen articles is calculated by the following calculation ... oxygen is an element of group 16, has 6 outer tronses (remember that we do not use the same number for electronic point fans). Hydrogen is an element of group 1 and therefore has a 1 valuation elém. A dipole results from an uneven distribution of the element pair in connection between the arts. Note that this structure looks exactly like methane structure, except that the central arter is a nitrogen. \ [F_c = 4- \ dfrac {1} {2} (8) -6 = 1 \] So let's try a compound that has pairs of Elés not connecting: water . The hydrogen streams are only able to form a connection for other arts, so we need to put the oxygenale in the center. Q2 define electronegativity. Do not worry about where these arts are positioned around the oxygen articles, this does not matter for this representation. These compounds exist as crystal truss with all those stacked in defined patterns. The formal charge for the oxygen articles is calculated by the following calculation ... to be able to recognize whether the type of van between two arcalent is covalent, Polar or ionic. Step 3: The next thing you should do is to draw the remaining Elérons in pairs around each of the oxygen oxygen OTOM More than 8 Elém Totals. This alerts people to the fact that the compound contains the group of Ammonio and the nitrate group. The carbon is in the element of the group 14, so it has 4 external electrical electrical (remember that we do not use the stupid number for electronic point fans). Think of the validity of each articles and make sure that these values are not exceeded, except in the case of NSS. Most compounds containing metals are ionic. Step 6: Calculating the formal charges by methane elements. Bond Covalent Polar: If the arts differ in your attraction by ElÃ © Trons, a polar-covalent connection will be formed. Step 6: Calculating the formal load for the Hydróxido, \ (\ CE {HO {HOP} \). Step 5: The formal charge for each of the articles is calculated by the following calculation: \ [f_c = 1 - \ dfrac {1} {2} (2) -0 = 0 \] The first number represents the Roman numeral on the periological table column. Step 1: Summarize the total number of values of validity for the elements in the molemple. The total number of tronses for all the arts is 8. This gives you a total of 8 Elém Elém and you drew the electronics point of electronics for methane. Knowledge of ElÃ © Trons helps to understand how the molems and elements react with each other. Step 4: All you need to do now is to attract all other hydrogens from hydrogen around the carbon articles and put 2 electrons between these hydrogen and the carbon articles. Step 3: The next step requires drawing a "C" and "h" and put 2 Elér estrons between these articles. If you get stuck, try asking another group for help. Nitrogen is an element of group 15 and therefore has 5 external elés. As there are 2 hydrogen articles, the total hydrogen will be of 2 Elérs. Ons are always more or less connections than the non-normal charge. The hydrogen there are capable of forming a connection to other arts, so Put the carbon atom in the center. Describe the type of van represented by the trait for each of the following compounds Definitions in Q1. We must subtract a polite charge for the positive charge. Never place a hydrogen bolt in the center, because you can only form a batch. If the molemplate is loaded, subtract a ElÃ © Tron for each positive charge or add a ElÃ © tron for each negative load. \ [F_C = 6 - \ Dfrac {1} {2} (2) - 4 = 0 \] The first number represents the Roman numeral on the periological table column. Elements in Group I for group 13 often do not follow the octet rule and have less than eight tronses in the final fan. Sober chloride is an example of a compound with this type of connection. Step 6: Calculating the formal charge of the articles in the water. Groups of Arts usually have the lower electronegative articles surrounded by articles with greater electronegativity. The number "2" in the paragraphs represents the shared electronics and there are no trons of non-collage so that the last number is zero. The formal charge for the carbon articles is calculated by the following calculation ... Since there are 4 hydrogen articles, we have 4 Elérons. The weaks are kept together by electrostatic attractions. The total number of tronses for all the arts, including the loss of a tron for positive load is 8. Step 1: The first thing you should do is determine the number of elãe trons available For the Formula? The hydrogen streams can only share in 2 Elés, so do not put more elés around them. The difference of electronegativeness between the connected articles determines the bench polarity, which is determined by the relative difference in electronegativity between two arts which are united by a chemical connection. The following image is a representation of a cubic crystal of sober chloride. The chloride are represented by the purple spheres. There are three types of titles: covalent titles, polar covalent bonds and ionic titles. Learning objectives can define covalent connections, connections polar, ethernistic alloys, electro negativity, electro negativity, Formal charge, molecular fury, structural fan and electronic point. The first electronics point of electronics let's draw will be methane, CH4. Oxygen is an element of group 16 and therefore has 6 elés external ... provided that there are 2 oxygen articles, there will be a total of 12 elés. Hydrogen is an element of group 1 and therefore has 1 ElÃ © Tron. Exhibition Methods of Molecular Formulas Compounds show only the type and number of aroms in a molemplate. Step 4: Subtract the used tronster number â €

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