

PRACTICE

DIRECTIONS: Arrange the following photons in order of decreasing energy.

thermal, cosmic rays, ultraviolet, orange, microwaves, green

cosmic rays, ultraviolet, green, orange, microwaves, thermal

THINK

What evidence supports the wave nature of light? the particle-like nature of light?

Light is wave because it can be diffracted and move through a vacuum. Light has particle nature due to the increase in mass when the energy increases.

DIRECTIONS: List the quantum numbers in order by name, symbol, and description.

Name	Symbol	Description
principal	n	the distance from the nucleus
angular momentum	l	the type and shape of orbital
magnetic	m_l	the position
spin	m_s	the electron spin

DIRECTIONS: List the four types of sub shells and the maximum number of orbitals in each.

s 1 p 3 d 5 f 7

DIRECTIONS: Write a brief description for each of the following.

Aufbau principle – start with the lowest available energy level

Pauli exclusion principle – no two electrons in the same atom can have the same 4 quantum numbers

Hund's rule – pair electrons in a sublevel only after each orbital has one

DIRECTIONS: Which element has the following electron configuration?

magnesium $1s^2 2s^2 2p^6 3s^2$

manganese $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$

DIRECTIONS: Write the electron configuration for the following elements.

Na $1s^2 2s^2 2p^6 3s^1$

Cu $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^{10}$

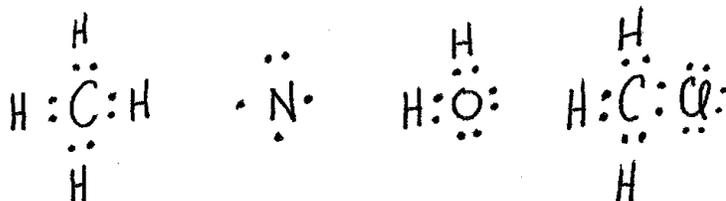
LIST 3 properties of an ionic compound.

between a metal and a nonmetal
 high boiling point
 high melting point
 crystalline solids
 dissolves in water
 electrolytes

LIST 3 properties of a covalent compound.

between a nonmetal and a nonmetal
 low boiling point
 low melting point
 solid, liquid or gas
 tend to not dissolve in water in water
 nonelectrolytes

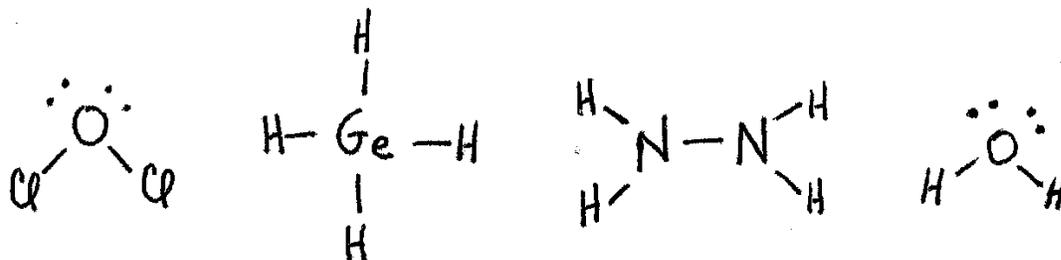
DRAW the Lewis dot symbols for the following: CH_4 ; N ; H_2O ; CH_3Cl ;



DETERMINE which type of chemical bond, (I)onic, (C)ovalent or (M)etallic, predominates in each of the following:

C OCl_2 C GeH_4 I CaF_2 I Fe_3Al I Na_2O C N_2H_4 I SnCl_4

DRAW structural formulas for these compounds: OCl_2 GeH_4 N_2H_4 SnCl_4 H_2O



WHAT is the driving force behind chemical bonding?

The driving force behind bonding is the tendency of atoms to gain or lose electrons to obtain a noble gas valence.

WRITE the formula for the following compounds.

$S_4 N_2$	tetrasulfur dinitride	$Si S_2$	silicon disulfide
OF_2	oxygen difluoride	$Bi O_3$	bismuth trioxide
$Pb (C_2H_3O_2)_2$	lead(II) acetate	$Ba_3(PO_4)_2$	barium phosphate
$Cu ClO_4$	copper(I) perchlorate	$Ca SO_4$	calcium sulfate
Na_2O_2	sodium peroxide	AgI	silver iodide

WRITE the name for the following compounds.

carbon tetrachloride	CCl_4	phosphorus trichloride	PCl_3	diarsenic trisulfide	As_2S_3
hydrogen bromide	HBr	antimony trichloride	$SbCl_3$	carbon tetrabromide	CBr_4
chromium (III) fluoride	CrF_3	silver bromide	$AgBr$	calcium sulfite	$CaSO_3$
magnesium hydroxide	$Mg(OH)_2$	ammonium dichromate	$(NH_4)_2Cr_2O_7$	potassium chlorate	$KClO_3$

WRITE the name for the following acids.

nitric acid	HNO_3	acetic acid	$HC_2H_3O_2$	hydrosulfuric acid	H_2S
phosphorous acid	HPO_3	sulfurous acid	H_2SO_3	hydrobromic acid	HBr

WRITE a balanced equation and classify the reaction.

- potassium chloride + silver nitrate \rightarrow silver chloride + potassium nitrate
 $KCl + AgNO_3 \rightarrow AgCl + KNO_3$ double replacement
- ammonium nitrite \rightarrow nitrogen + water
 $NH_4NO_2 \rightarrow N_2 + 2 H_2O$ decomposition
- hydrogen + bromine \rightarrow hydrogen bromide
 $H_2 + Br_2 \rightarrow 2 HBr$ synthesis
- sodium hydroxide + hydrochloric acid \rightarrow sodium chloride + water
 $NaOH + HCl \rightarrow NaCl + HOH$ double replacement
- barium carbonate \rightarrow barium oxide + carbon dioxide
 $BaCO_3 \rightarrow BaO + CO_2$ decomposition

DIRECTIONS: Find the molar mass of the following:

32.00 g O₂

$$16.00 \times 2 = 32.00$$

233.00 g Fe(C₂H₃O₂)₃

$$\text{Fe} = 55.85 \times 1 = 55.85$$

$$\text{C} = 12.01 \times 6 = 72.06$$

$$\text{H} = 1.01 \times 9 = 9.09$$

$$\text{O} = 16.00 \times 6 = 96.00$$

63.02 g nitric acid HNO₃

$$\text{H} = 1.01 \times 1 = 1.01$$

$$\text{N} = 14.01 \times 1 = 14.01$$

$$\text{O} = 16.00 \times 3 = 48.00$$

"Energy and persistence conquer all things." -- Benjamin Franklin