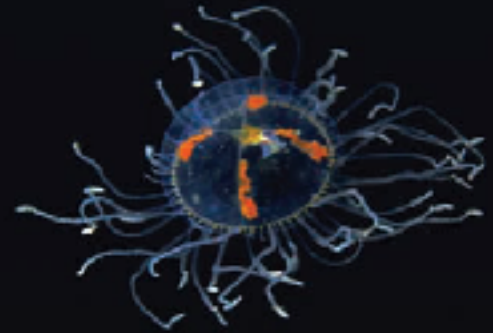


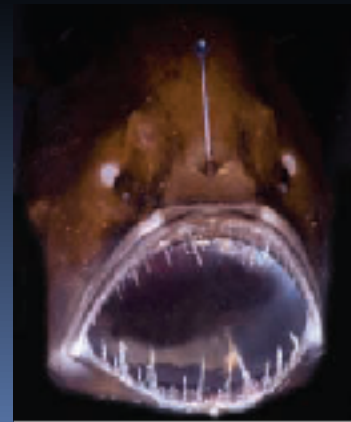
# PRODUCING VISIBLE LIGHT



# Bioluminescence



- **The ability of a plant or animal to produce light**
- Most deep sea creatures are bioluminescent
- Some fish produce their own light, while others have bacteria that carry out the light-producing chemical reaction for them.



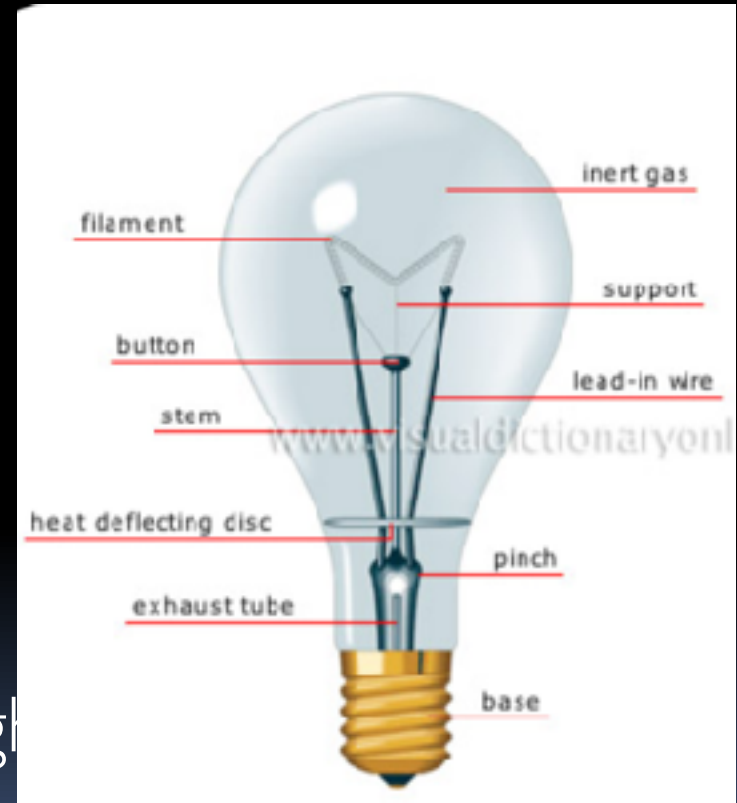
# Bioluminescence

- used to attract prey, provide camouflage, and keep schools together.
- fire flies use light to attract mates.
- Some Fungi and bacteria can also produce light



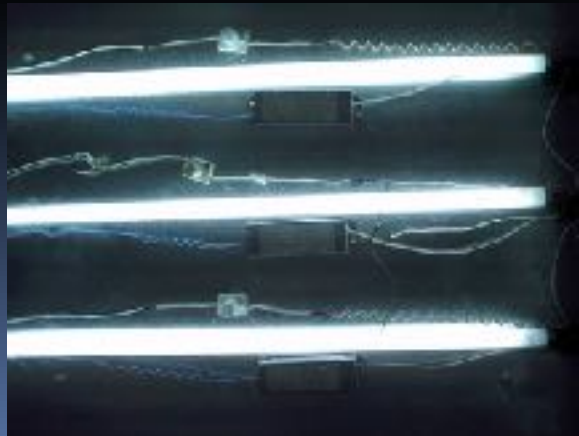
# Incandescent Light

- Produced light at a very high temperature. (inefficient)
- a tungsten filament is heated with electric current to an extremely high temperature.
- The filament release energy as glows.
- only 5 percent of the electrical energy used is converted to light



# Fluorescent Light

- electricity running through the gas in the bulb **ultraviolet radiation.**
- the gas is mercury vapour.
- The bulb is coated with a white powder called a **phosphor.**



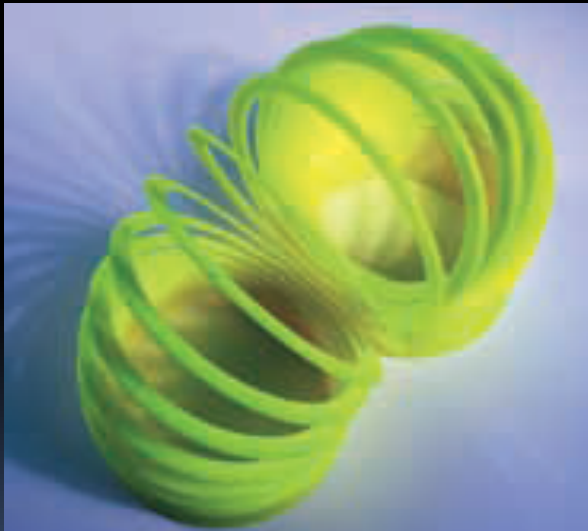
# Fluorescent Light



- the ultraviolet radiation emitted strikes the phosphor, emits \*\*\*\*visible light\*\*\*\*
- **20% of the energy in light.** The rest is heat

# Phosphorescent Light

- Some substances have the ability to store energy from radiation.



# Phosphorescent Light

- Phosphorescence is the ability to store energy then emit it slowly over a long period.
- 'glow in the dark' materials

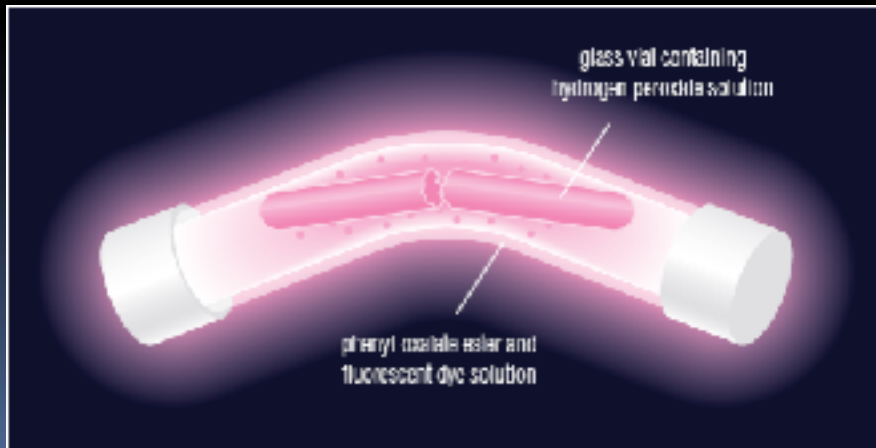






# Chemiluminescence

- Light produced from a chemical reaction without a rise in temperature.
- bioluminescence is kinds of chemiluminescence.
- Example: Glow sticks



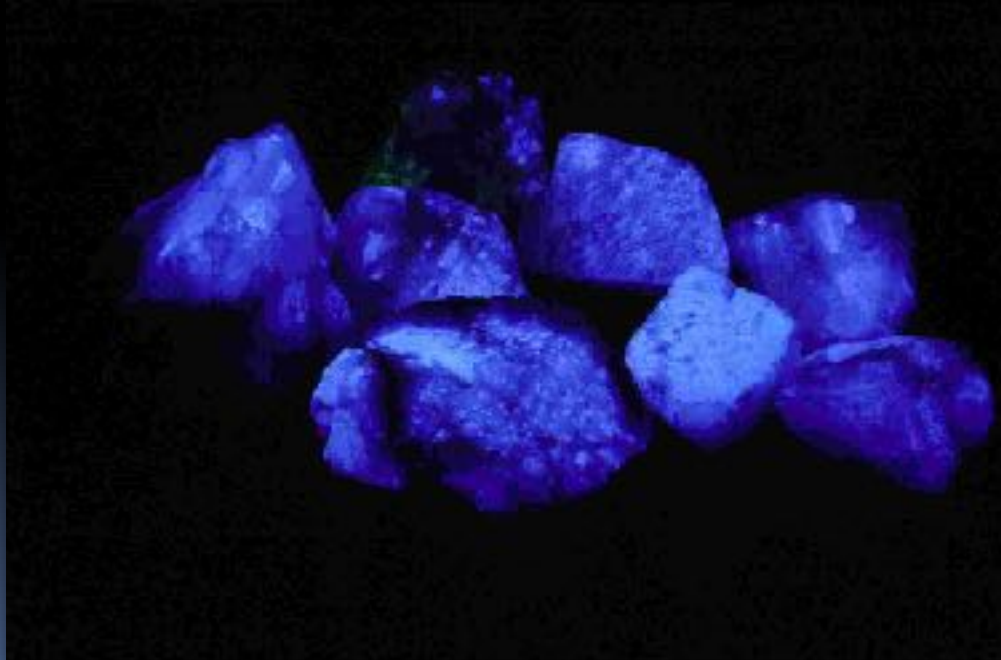
# Chemiluminescence

- Chemiluminescence is also used in analyzing crime scenes.
- Investigators use a chemical called luminol to detect
- traces of iron found in blood cause the chemical to glow



# Triboluminescence

- **Producing light from friction**
- Some crystals can be made to glow simply by rubbing them together or crushing them.



# Electric Discharge

- like fluorescences **light, electric currents pass through a gas (usually noble gases)**
- Example: Neon lights, Lightning, Carbon arcs, HIDs



Hydrogen 1 H 1.00794																	Helium 2 He 4.002602					
Lithium 3 Li 6.941	Boron 5 B 10.811	Carbon 6 C 12.011	Nitrogen 7 N 14.007	Oxygen 8 O 15.999	Fluorine 9 F 18.998	Neon 10 Ne 20.180																
Sodium 11 Na 22.990	Aluminum 13 Al 26.982	Silicon 14 Si 28.086	Phosphorus 15 P 30.974	Sulfur 16 S 32.065	Chlorine 17 Cl 35.453	Argon 18 Ar 39.948																
Potassium 19 K 39.098	Calcium 20 Ca 40.078	Scandium 21 Sc 44.956	Titanium 22 Ti 47.882	Vanadium 23 V 50.942	Chromium 24 Cr 51.996	Manganese 25 Mn 54.938	Iron 26 Fe 55.845	Cobalt 27 Co 58.933	Nickel 28 Ni 58.693	Copper 29 Cu 63.546	Zinc 30 Zn 65.38	Gallium 31 Ga 69.723	Germanium 32 Ge 72.63	Arsenic 33 As 74.922	Selenium 34 Se 78.96	Bromine 35 Br 79.904	Krypton 36 Kr 83.80					
Rubidium 37 Rb 85.468	Sr 38 Sr 87.62	Yttrium 39 Y 88.906	Zr 40 Zr 91.224	Nb 41 Nb 92.906	Mo 42 Mo 95.94	Tc 43 Tc 98	Ru 44 Ru 101.07	Rh 45 Rh 102.91	Pd 46 Pd 106.42	Ag 47 Ag 107.87	Cd 48 Cd 112.41	In 49 In 114.82	Sn 50 Sn 118.71	Sb 51 Sb 121.76	Te 52 Te 127.6	I 53 I 126.905	Xe 54 Xe 131.29					
Cesium 55 Cs 132.91	Ba 56 Ba 137.33	* 57-70	Lu 71 Lu 174.967	Hf 72 Hf 178.49	Ta 73 Ta 180.948	W 74 W 183.84	Re 75 Re 186.207	Os 76 Os 190.23	Ir 77 Ir 192.22	Pt 78 Pt 195.08	Au 79 Au 196.967	Hg 80 Hg 200.59	Tl 81 Tl 204.38	Pb 82 Pb 207.2	Bi 83 Bi 208.98	Po 84 Po [209]	At 85 At [210]	Rn 86 Rn [222]				
Francium 87 Fr [223]	Ra 88 Ra [226]	* * *	Lr 103 Lr [260]	Rf 104 Rf [261]	Db 105 Db [262]	Sg 106 Sg [263]	Bh 107 Bh [264]	Hs 108 Hs [265]	Mt 109 Mt [266]	Uun 110 Uun [267]	Uuu 111 Uuu [268]	Uub 112 Uub [269]						Uuq 114 Uuq [270]				

\* Lanthanide series

Lanthanum 57 La 138.91	Cerium 58 Ce 140.12	Praseodymium 59 Pr 140.91	Neodymium 60 Nd 144.24	Europium 61 Eu 151.96	Gadolinium 62 Gd 157.25	Terbium 63 Tb 158.93	Dysprosium 64 Dy 162.50	Ho 65 Ho 164.93	Erbium 66 Er 167.26	Thulium 67 Tm 168.93	Ytterbium 68 Yb 173.05	Lutetium 69 Lu 174.967
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\*\* Actinide series

Actinium 89 Ac [227]	Thorium 90 Th [232]	Protactinium 91 Pa [231]	Uranium 92 U [238]	Neptunium 93 Np [237]	Plutonium 94 Pu [244]	Americium 95 Am [243]	Curium 96 Cm [247]	Berkelium 97 Bk [247]	Californium 98 Cf [251]	Einsteinium 99 Es [252]	Fermium 100 Fm [257]	Mendelevium 101 Md [258]	Noelium 102 No [259]
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# Light-Emitting Diode (LED)



- The process of transforming electrical energy directly into light energy is called **electroluminescence**
- (LED) is an **electroluminescent light source made out of a material called a semiconductor.**
- **a semi conductor release positive 'holes' and join with negative charged electrons from a different semiconductor come together to release light**
- <https://www.youtube.com/watch?v=lwv5momDiKQ>

# Light-Emitting Diode (LED)

- since solid materials are used, they are very rugged
- LEDs are very efficient producers of light
- Uses: electronic billboards, traffic lights, new car lights, new bulbs.







Homework Read pages 470–476

Read pages 470–476 Questions 1–10

