Fe_2O_3 hematite (red)

$[FeO(OH)+H_2O]$ Limonite (yellow)

Carbon dioxide	+	Water	SUNLIGHT →	Sugar	+	Oxygen
$6CO_2$		$6H_2O$		$C_6H_{12}O_6$		$6O_2$

Oxygen in nature

- Oxygen is the most abundant element in the Earth crust – in minerals and combined with other elements it makes up 47% of its mass
- In the atmosphere it is present at 21% by volume or at 23% by mass
- Earth's hydrosphere contains 86-89% of oxygen by mass

Oxygen

- Element # in Periodic table

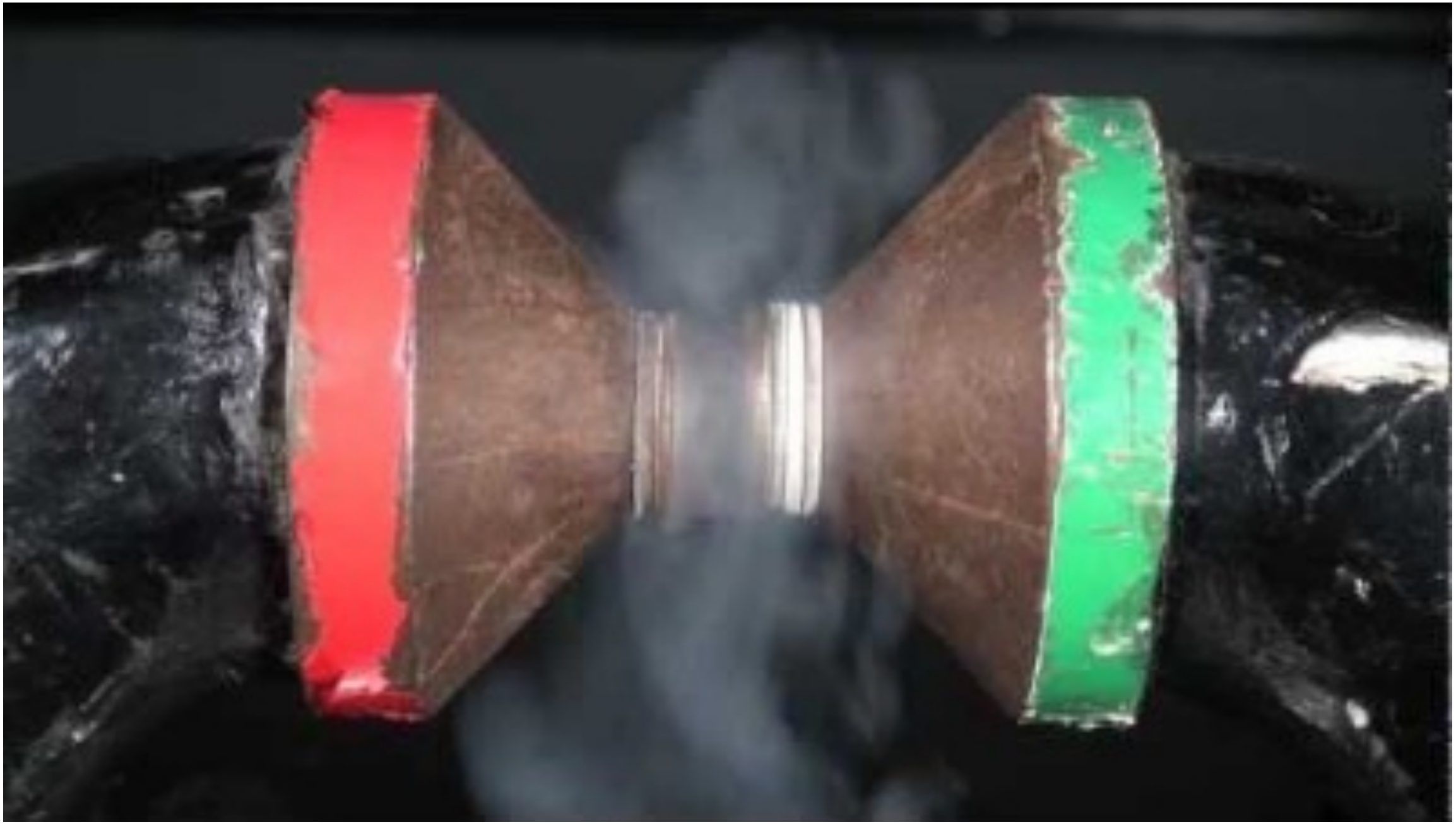
- Chemical symbol – O
- Atomic mass – 16
- Electron configuration – $1s^2 2s^2 2p^4$

- Valency of oxygen in its compounds is II

- Most common oxidation state is (-2)

- Molecule of oxygen is O_2 with molecular weight 32 g/mole

https://youtu.be/Lt4P6ctf06Q



Obtaining oxygen

- In industry oxygen is produced from liquid air (high compression with heating up → expansion with strong cooling down → liquid air (liquid oxygen boils at (-183°C), liquid nitrogen boils at (-196°C)) → slow temperature increase to separate the gasses (distillation)

  - In laboratory:

$2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$

$2KClO_3 \rightarrow 2KCl + 3O_2$

$2KNO3 \rightarrow 2KNO2 + O2$

$^{2}\ H_2O_2 \rightarrow 2H_2O + O_2$

$2Na_2O_2 + 2CO_2 \rightarrow 2Na_2CO_3 + O_2$

https://youtu.be/_Y1alDuXm6A

Burning is a fast oxidation process with the release of heat and usually of light

https://youtu.be/mXv38UvP_tQ

https://youtu.be/l13UkaZQ4Ec

Slow oxidation

$$2Cu + O_2 = 2CuO$$

$$4Fe + 3{2O_2} + 2nH_2O = 2\ Fe_2O_3 \cdot n\ H_2O$$

$$O_2 + 2H_2 = 2\ H_2O$$

EXPLOSIVE REACTION

https://youtu.be/iCXQ3nKF2no