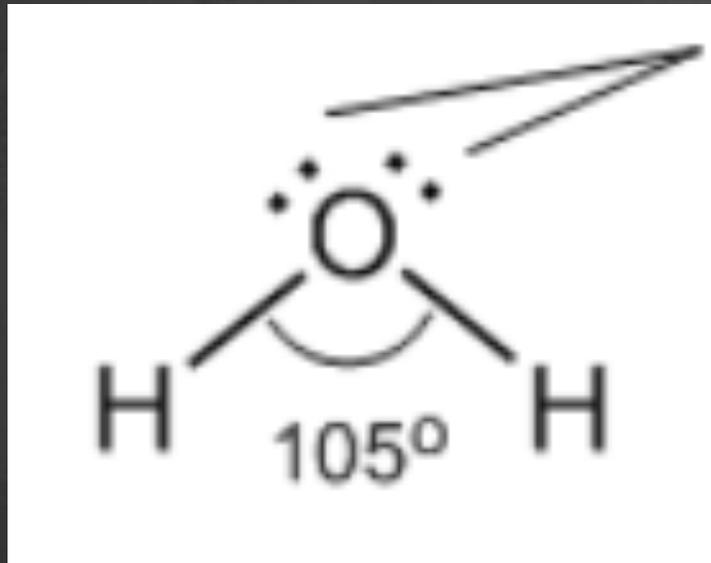


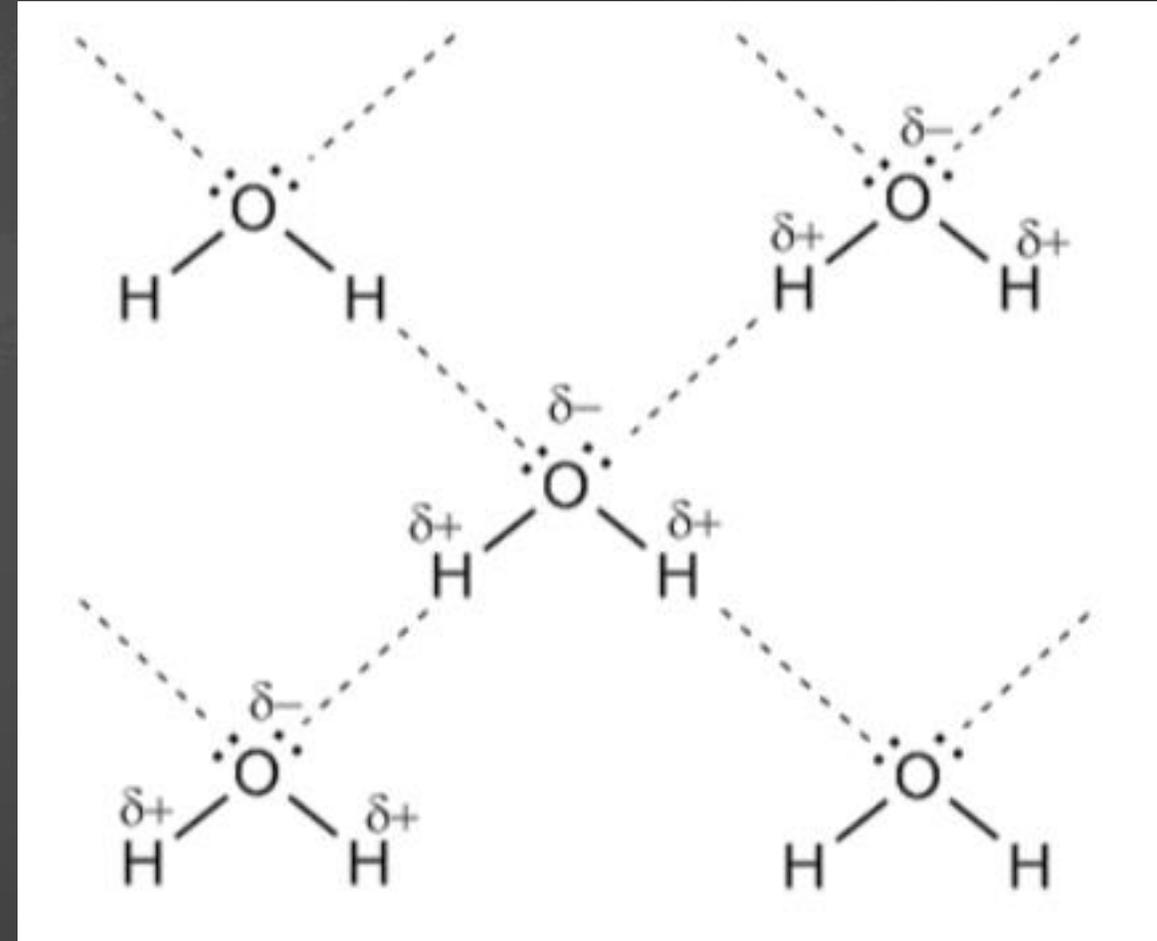
Water, hydrogen bond



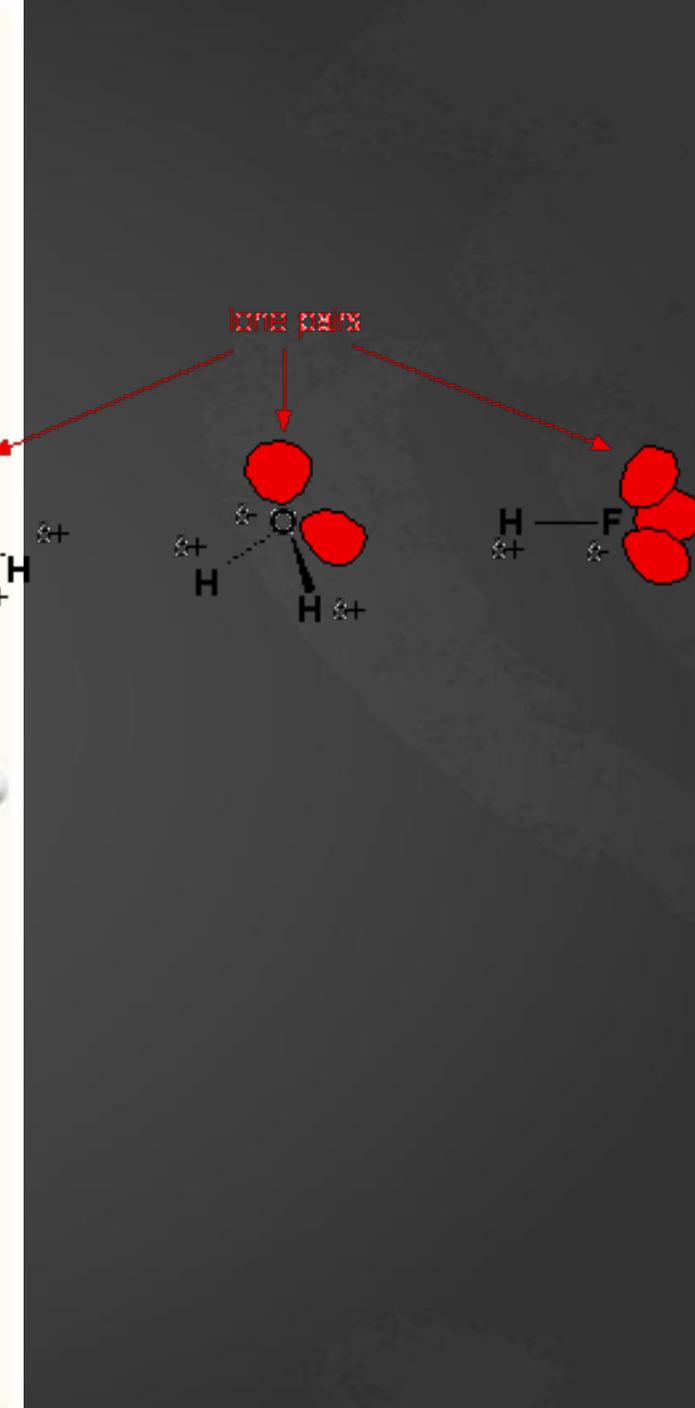
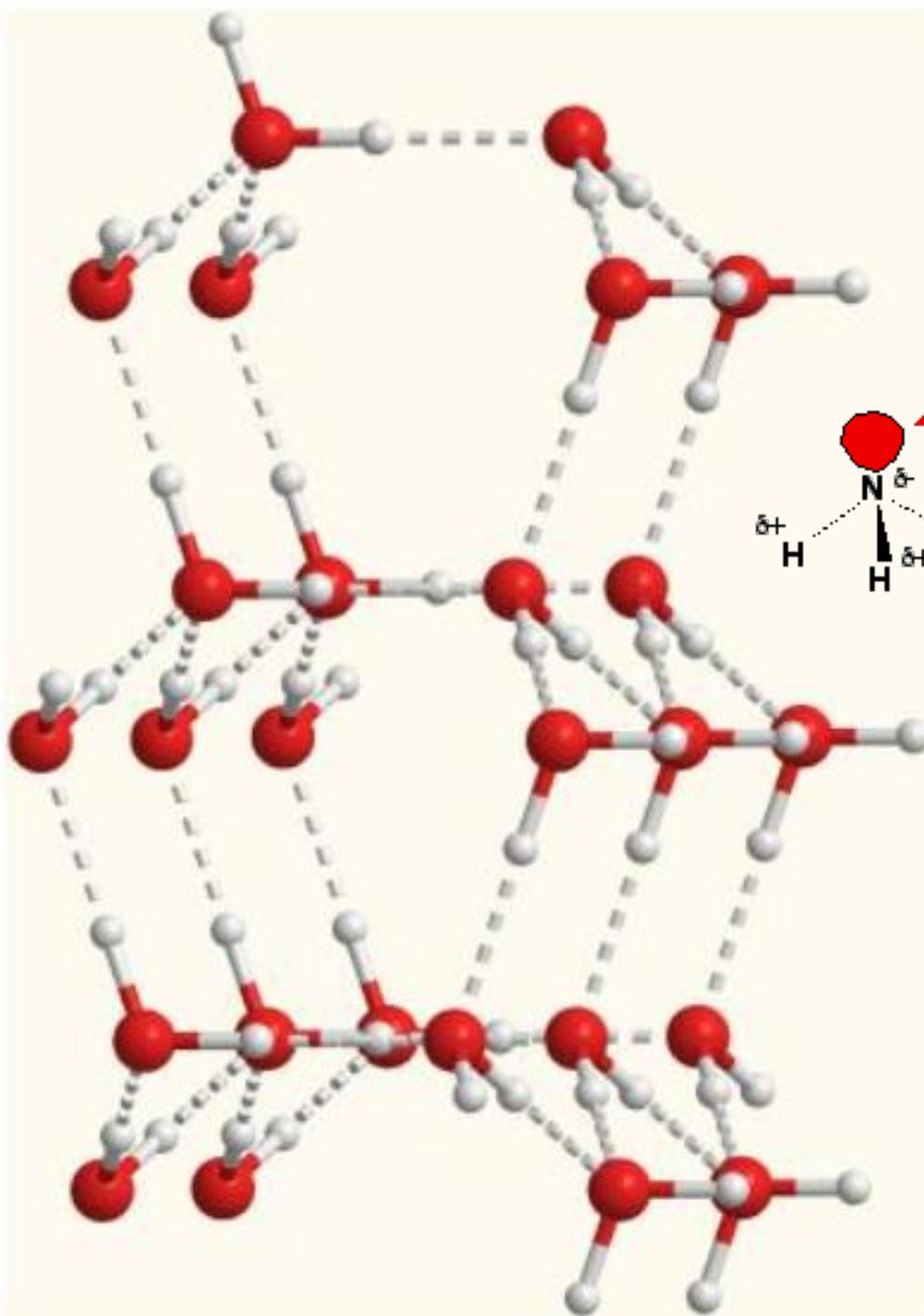
Unpaired electrons

A water molecule is called a dipole, because it has two electric poles.

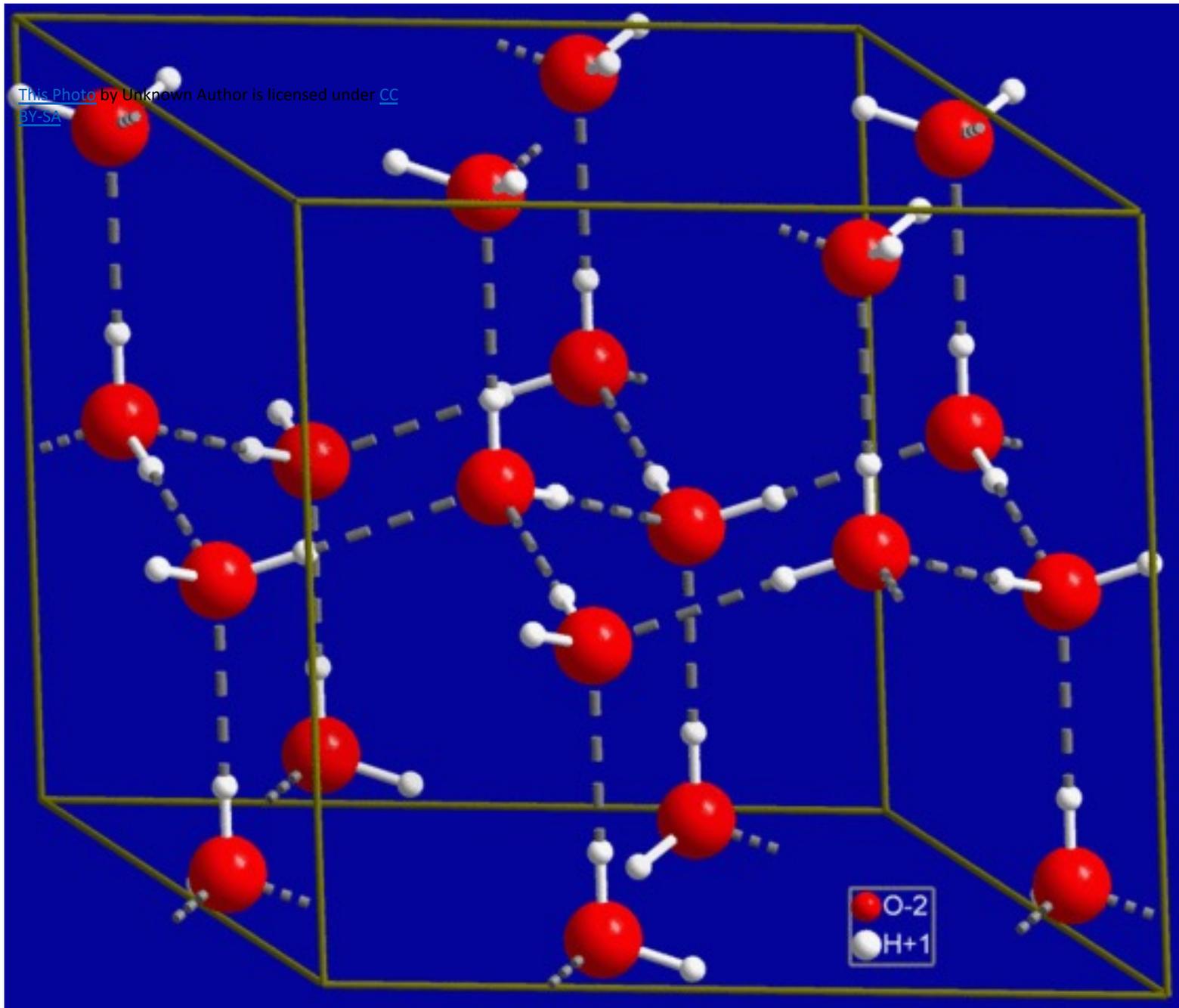
Tetrahedron



Hydrogen bond is the strongest of the intermolecular forces, but it is much weaker, than covalent bond.



Ice





<https://youtu.be/dHJmOH38agY>

Chemical properties of water

1. Reactions with metals and non-metals with release of hydrogen



2. Water decomposes into oxygen and hydrogen under electrical current



<https://youtu.be/oqMN3y8k9So>



Only active metals can participate in redox reactions with water

	Element	Oxidation Reaction
<div style="text-align: center;"> <p>React vigorously with cold H₂O to form H₂</p> <p>↓</p> <p>React with steam to form H₂</p> <p>↓</p> <p>React with simple acids to form H₂</p> <p>↓</p> <p>Will not dissolve in simple acids</p> <p>↓</p> </div>	Lithium	Li → Li ⁺ + e ⁻
	Potassium	K → K ⁺ + e ⁻
	Barium	Ba → Ba ²⁺ + 2e ⁻
	Calcium	Ca → Ca ²⁺ + 2e ⁻
	Sodium	Na → Na ⁺ + e ⁻
	Magnesium	Mg → Mg ²⁺ + 2e ⁻
	Aluminum	Al → Al ³⁺ + 3e ⁻
	Manganese	Mn → Mn ²⁺ + 2e ⁻
	Zinc	Zn → Zn ²⁺ + 2e ⁻
	Chromium	Cr → Cr ³⁺ + 3e ⁻
	Iron	Fe → Fe ²⁺ + 2e ⁻
	Cadmium	Cd → Cd ²⁺ + 2e ⁻
	Cobalt	Co → Co ²⁺ + 2e ⁻
	Nickel	Ni → Ni ²⁺ + 2e ⁻
	Tin	Sn → Sn ²⁺ + 2e ⁻
	Lead	Pb → Pb ²⁺ + 2e ⁻
	Hydrogen	H ₂ → 2H ⁺ + 2e ⁻
	Copper	Cu → Cu ²⁺ + 2e ⁻
	Silver	Ag → Ag ⁺ + e ⁻
Mercury	Hg → Hg ²⁺ + 2e ⁻	
Platinum	Pt → Pt ²⁺ + 2e ⁻	
Gold	Au → Au ⁺ + e ⁻	

Increasing ease of oxidation

3. water reactions with non-metal oxides (combination)



4. Some metal oxides also can react with water (combination)



2	3 Li Lithium 6.941	4 Be Beryllium 9.012										5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	
3	11 Na Sodium 22.990	12 Mg Magnesium 24.305										13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.066	17 Cl Chlorine 35.453	
4	19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.88	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904

5. Water forms compounds where its molecule does not decompose (hydrates)



Hydrate is the most abundant type of structure, it is supported by hydrogen bonds. It absorbs water from the surrounding very easily.



<https://youtu.be/cRXEClq-1zQ>